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PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 1.

JANUARY, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that the full title of Paper, name of Author, page reference, and date of presentation to the Society, are given.

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NEW YORK 1904.

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American Society of Civil Engineers.

OFFICERS FOR 1904.

President, CHARLES HERMANY.

Vice-Presidents.

Term expires January, 1905:	*Term expires January, 1906:*
L. F. G. BOUSCAREN,	F. S. CURTIS,
JAMES D. SCHUYLER.	S. L. F. DEYO.

Secretary, CHARLES WARREN HUNT.

Treasurer, JOSEPH M. KNAP.

Directors.

Term expires January, 1905:	*Term expires January, 1906:*	*Term expires January, 1907:*
RICHARD S. BUCK,	ALFRED CRAVEN,	CHARLES S. GOWEN,
GEORGE H. PEGRAM,	JOSEPH O. OSGOOD,	N. P. LEWIS,
WILLIAM J. WILGUS,	GEORGE S. DAVISON	JOHN W. ELLIS,
WILLIAM JACKSON,	E. C. LEWIS,	GEORGE S. WEBSTER,
EDMUND F. VAN HOESEN,	HUNTER McDONALD.	RALPH MODJESKI,
JAMES L. FRAZIER.	ELWOOD MEAD.	CHARLES D. MARX.

Assistant Secretary, T. J. McMINN.

Standing Committees.

THE PRESIDENT OF THE SOCIETY IS *ex-officio* MEMBER OF ALL COMMITTEES.

On Finance:	*On Publications:*	*On Library:*
S. L. F. DEYO,	GEORGE H. PEGRAM,	N. P. LEWIS,
L. F. G. BOUSCAREN,	ALFRED CRAVEN,	WILLIAM JACKSON,
RICHARD S. BUCK,	JOSEPH O. OSGOOD,	E. C. LEWIS,
WILLIAM J. WILGUS.	GEORGE S. DAVISON.	RALPH MODJESKI,
CHARLES S. GOWEN,	HUNTER McDONALD.	CHARLES WARREN HUNT.

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ON RAIL SECTIONS :—G. Bouscaren, C. W. Buchholz, S. M. Felton, Robert W. Hunt, John D. Isaacs, Richard Montfort, H. G. Prout, Joseph T. Richards, Percival Roberts, Jr., George E. Thackray, Edmund K. Turner, William R. Webster.

◆

The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER, - - 533 Columbus
CABLE ADDRESS, - - - - "Ceas, New York."

Vol. XXX. JANUARY, 1904. No. 1.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

January 6th, 1904.—The meeting was called to order at 8.45 P. M., President Noble in the chair; Charles Warren Hunt, Secretary; and present, also, 103 members and 10 guests.

The minutes of the meetings of December 2d and 16th, 1903, were approved as printed in the *Proceedings* for December, 1903.

A paper, entitled "Theory of the Spherical Dome with a Homogeneous Surface, and of the Framed Dome; Also Notes on the Construction of Masonry and Metal Domes," by E. Schmitt, Assoc. M. Am. Soc. C. E., was presented by the author and illustrated with lantern slides. A communication on the paper, from Irving P. Church, Assoc. Am. Soc. C. E., was presented by the Secretary.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Richard Parkhurst Bloss, Mechanicsville, N. Y.
James Francis Case, Manila, Philippine Islands.
Henry Frederick Dose, New York City.
Harrison Souder, Johnstown, Pa.

As Associate Members.

Frederick Whitney Adgate, Omaha, Nebr.
Harold Kilbreth Barrows, Burlington, Vt.
Herbert Nichols Cole, Milwaukee, Wis.
Noah Cummings, New York City.
Andrew Daniel Fuller, Boston, Mass.
John Roworth Rainbow, New York City.
Eugene Peronneau Roundey, Utica, N. Y.
Eddy Elbert Young, New York City.

As Associate.

Safford Kinkead Colby, New York City.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on January 5th, 1904, from the grade of Associate Member to the grade of Member:

As Members.

Edwin James Beugler, Boston, Mass.
Ernest Henry Brownell, Portsmouth, N. H.
James Burden, Troy, N. Y.
Leonard Martin Cox, Sparrows Point, Md.
Frederic Harold Fay, Boston, Mass.
Clarence William Hubbell, Detroit, Mich.
Julian de Bruyn Kops, Savannah, Ga.
Charles Adriance Mead, Upper Montclair, N. J.
Rudolph Philip Miller, New York City.
Charles Hamilton Mitchell, Niagara Falls, Ont., Canada.
Arthur Marquis Scripture, New Hartford, N. Y.

The Secretary announced the election of the following candidates by the Board of Direction, on January 5th, 1904:

AS JUNIORS.

WALTER LORING ANTHONY, Providence, R. I.
RALPH HAMLIN, New York City.
GEORGE GALLAGHER HOPKINS, Jr., Brooklyn, N. Y.
LEROY LITTLEFIELD HUNTER, Pittsburg, Pa.
BOUDINOT GAGE LEAKE, Ft. Worth, Tex.
HENRY MCBURNEY, Philadelphia, Pa.

The Secretary announced the following deaths:

JAMES PETER BOGART, elected Junior January 4th, 1882; Member July 3d, 1895; died December 24th, 1903.

EDWARD BERNARD IVES, elected Member April 5th, 1893; died December 30th, 1903.

CLARK FISHER, elected Member October 19th, 1870; died December 31st, 1903.

The Secretary announced the details of the programme of the Annual Meeting.

Adjourned.

January 20th, 1904.—The minutes of this, the Annual Meeting, will be printed in the *Proceedings* for February, 1904.

OF THE BOARD OF DIRECTION.

(Abstract.)

January 5th, 1904.—8.30 P. M.—President Noble in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Craven, Croes, Freeman, Jackson, Kuichling, Osgood, Pegram, Schneider and Swain.

A report was received from a Special Committee, recommending that this Society undertake the organization and management of an International Engineering Congress, to be held in St. Louis during the week beginning October 3d, 1904. The recommendation of the Committee was adopted as the action of the Board.

The Annual Report of the Board to the Society was adopted.

The following report was received:

"TO THE BOARD OF DIRECTION,
AMERICAN SOCIETY OF CIVIL ENGINEERS:

"The Committee appointed to recommend the award of prizes for papers in *Transactions* for the year ending July, 1903, respectfully makes the following report:

"Your Committee having carefully considered all of the papers in Volumes XLIX and L of *Transactions* recommends that no award of The Norman Medal be made this year.

"The Committee recommends that The Thomas Fitch Rowland Prize be awarded to Paper No. 954, 'The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey,' by George W. Fuller, Assoc. M. Am. Soc. C. E.

"The Committee further recommends that The Collingwood Prize for Juniors be awarded to Paper No. 939, 'The Footbridge for Building the Cables of the New East River Bridge,' by Isaac Harby, Jun. Am. Soc. C. E.

"All of which is respectfully submitted.

"Mansfield Merriman,
"E. P. Dawley,
"W. Kiersted,
"*Committee.*

"December 5th, 1903."

The recommendations of the Committee were adopted as the action of the Board.

Letters were presented from the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, stating that they had arranged to establish headquarters in the Machinery Hall Building, and Electricity Building, respectively, and inviting the members of this Society to avail themselves of these headquarters.

The following resignations were accepted, taking effect December 31st, 1903:

James Imbrie Miller, Jacob Herbert Sawyer, Harry Van Vleck Gifford, Henry Garfield Perring.

J. L. Van Ornum, M. Am. Soc. C. E., was added to the Committee of the Society in charge of the Society's exhibit and headquarters for engineers at St. Louis.

Arguments for and against the joining of this Society in the proposed Union Engineering Building, for presentation to the Annual Meeting, were considered.

Applications were considered and other routine business transacted.

Eleven Associate Members were transferred to the grade of Member, and six candidates for Junior were elected.*

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* See pages 2 and 3.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, February 3d, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "Method Used by the Railroad Commission of Texas, in Valuing Railroad Properties, Under the Stock and Bond Law," by R. A. Thompson, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, February 17th, 1904.—8.30 P. M.—At this meeting a paper, entitled "Freezing as an Aid to Excavation in Unstable Material," by James H. Brace, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

A Committee of the Board of Direction is now arranging a programme, with a view to making this Convention an International Meeting of Engineers, for the presentation and discussion of timely subjects of professional interest.

As the details of the arrangements are developed, they will be announced in *Proceedings.*

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

Robert Moore, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
James L. Frazier, " " Frankfort, Ind.
William Jackson, " " Boston, Mass.
Emil Kuichling, " " New York, N. Y.
J. L. Van Ornum, " " St. Louis, Mo.
John F. Wallace, " " Chicago, Ill.
H. J. Pfeifer, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary.*

INTERNATIONAL ENGINEERING CONGRESS.

The Board of Direction has decided to organize and conduct an International Engineering Congress, to be held in St. Louis, Mo., during the week beginning October 3d, 1904. A committee appointed for the purpose has formulated a general plan for this Congress, the essential features of which are as follows:

A number of subjects of live interest have been chosen and on each of these, a specialist is to be selected in America, and as far as possible in each foreign country, and asked to contribute a paper giving a succinct review of the progress in this special branch of Civil Engineering, during the past ten years, with a summary of present practice.

These papers will be printed in advance, and each subject will be open to discussion at the Congress, at which no papers will be read. The papers, together with the discussion upon them, will be collated and published in one or more volumes, which will be furnished free of charge to each Member of the Society, and to such other persons as become Members of the Congress by the payment of $5.

Already the acceptances of the invitations to prepare papers issued by the Committee indicate a gratifying interest, and a large attendance is expected, inasmuch as the Society Convention will be held at the same date, and the expected visit of Members of the Institution of Civil Engineers of Great Britain will be so timed that all who visit us in the Society House in New York will have an opportunity to attend.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ANNUAL REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31st, 1903.

Presented at the Annual Meeting, January 20th, 1904.

The Board of Direction, in compliance with the Constitution of the Society, presents its report for the year ending December 31st, 1903.

MEMBERSHIP.

The changes in membership are shown in the following table:

Grade.	Jan. 1st, 1903.			Jan. 1st, 1904.			Losses.				Additions.		Totals.	
	Resident.	Non-Resident.	Total.	Resident.	Non-Resident.	Total.	Transfer.	Resignation.	Dropped.	Death.	Transfer.	Election.	Loss.	Gain.
Honorary Members	1	8	9	1	8	9	..	..	..	..	....	....	....	....
Corresponding Members	....	2	2	....	2	2	..	..	..	..	....	....	....	....
Members	312	1 263	1 575	335	1 322	1 657	..	6	13	25	*34	92	44	126
Associate Members	192	522	714	209	600	809	32	1	3	3	†33	101	39	134
Associates	43	76	119	48	77	125	1	2	..	1	‡2	8	4	10
Juniors	107	153	260	117	176	293	36	3	15	2	....	89	56	89
Fellows	10	23	33	8	21	29	..	..	..	4	....	....	4	....
Totals	665	2 047	2 712	718	2 206	2 924	69	12	31	35	69	290	147	359

* 32 Associate Members and 2 Juniors.
† 1 Associate and 32 Juniors.
‡ 2 Juniors.

It will be seen that the net increase during the year was 212, which is the largest yearly increase in the history of the Society. Previous to 1899, the yearly increase reached 100 in four cases only, no two of which were consecutive; since that date, the net yearly increase has been as follows:

1899	103
1900	138
1901	190
1902	185
1903	212
Total net increase for five years	828
Average net yearly increase for the past five years	166
Average net yearly increase from 1869 to 1898, inclusive	62

The total number of applications received during the year was 432.

The Board has taken action as follows:

Passed to ballot as Member	149	
Passed to ballot as Associate Member	151	
Passed to ballot as Associate	1	
		301
Transferred from Associate Member to Member	6	
		6
Elected Associate	10	
Elected Junior	99	
		109
Total		416
Applications now awaiting action		92

In explanation of the foregoing figures, it should be stated that an amendment to the Constitution, which became operative on November 6th, 1903, places the responsibility for transfers from all grades, except that of Junior, in the hands of the Board. The time has been short since this amendment went into effect, but the Board wishes to state that at least one of its provisions, under which all applications are presented for admission and not for a particular grade, has already demonstrated great improvement over the old method; the opinions of members, whether endorsers or not, are now unhampered by the fact that applicants have applied for a particular rating, and are given much more freely.

The losses by death reported during the year number 35. They are as follows:

Members: Sylvanus Thayer Abert, Frederick Winn Bond, William Warren Card, Charles Frederick Dunham, William Buel Franklin, Alphonse Fteley, Estevan Antonio Fuertes, Charles Ezra Greene, Edward Appleton Greene, George Richardson Hardy, Edward Bernard Ives, Charles Andrews Knowlton, Edmund Dorman Libby, Charles Cyril Martin, George Shattuck Morison, Henry Grant Morse, Cornelius Palmer, John Austin Patterson, Watson Wellman Rich, Alfred L. Rives, Elnathan Sweet, William George McNeill Thompson, Robert Henry Thurston, Eugene Vanderpool, Reuel Willard Ware.

Associate Members: John Walker Barriger, Jr., Robert Delano Cushing, Robert Blum Olney.

Associates: John Elfreth Watkins.

Juniors: Benjamin Harrison Flynn, Norman Smith Latham.

Fellows: Victor M. Clement, Walter S. Gurnee, Benjamin Franklin Jones, William Johnston Taylor.

LIBRARY.

The accessions to the Library during the year are shown in the following table:

Accessions During the Year 1903.

	Bound Volumes.	Unbound Volumes.	Specifications.	Maps, Photographs and Drawings.	Total.
Donations—					
In answer to special requests	457	1 285	1	1	1 744
From publishers	78	4	1	....	83
Eng. News Pub. Co.	54	170	25	....	249
Hammond Bequest	55	20	....	....	75
In regular course	352	507	178	311	1 348
Exchange of duplicates	97	166	....	....	263
By purchase	159	29	....	....	188
Totals	1 252	2 181	205	312	3 950

In addition to the above, there have been received 652 duplicates, and 28 separate numbers to complete files of periodicals, neither of which can appear as accessions.

The Library now contains:

Bound volumes	12 582
Unbound volumes	25 907
Specifications	5 863
Maps, photographs and drawings	3 312
Total	47 664*

The total number of titles in the Library is 19 853.

During the year, 228 volumes have been bound, and 29 bound volumes which were duplicates were received and have replaced previously unbound volumes.

The following amounts have been expended upon the Library during the year:

Purchase of books, 188 volumes	$636.33
Express charges, etc	42.54
Binding 228 volumes	260.15
Fixtures and supplies	4.71
Total	$943.73

---

* The total number of accessions to date is 51 547, inasmuch as 3 883 pamphlets are bound in volumes with other pamphlets, and each such volume can be given in the above list once only.

The value of the accessions to the Library during the year is as follows, each accession having been valued separately, as received:

3 762 Donations and exchanges (estimated value)	$2 121.11
188 Volumes purchased (cost)	636.33
Binding 228 volumes	260 15
Total	$3 017.59

The attendance at the Library has increased materially during the year, and a number of searches have been made for members who could not consult the Library in person.

During the year, the second volume of the Catalogue of the Library was prepared and published.

PUBLICATIONS.

During the year the usual ten numbers of *Proceedings* and two volumes of *Transactions* have appeared.

In the *Proceedings*, the list of references to current engineering literature has covered 81 pages, containing 3 489 classified references to 65 periodicals.

The stock of the various publications of the Society, kept on hand for the convenience of members and others, now amounts to 121 753 copies, the cost of which to the Society, for paper and presswork only, has been $14 401.85.

During the year, 3 895 volumes of the Society publications have been bound, for members and others, in the standard half-morocco or cloth bindings.

The extra publications during the year have been: Vol. 2 of the Catalogue of the Library; an advance issue of the "Report in Full of the Annual Convention"; a pamphlet entitled "The House of the American Society of Civil Engineers"; and circulars relating to a proposed Union Engineering Building.

SUMMARY OF PUBLICATIONS FOR 1903.

	Issued.	Edition.	Total Pages.	Plates.	Cuts.
Transactions (Volumes)*	2	3 200	1 005	54	172
Proceedings (Monthly Numbers)**	10	3 275	1 717	67	247
Advance copy of Report of Convention	1	3 000	80	....	....
Constitution and List of Members	1	3 500	213	....	1
Catalogue of Library	1	3 200	293	....	....
Society House Pamphlet	1	3 200	21	15	....
Totals	16	......	3 329	136	420

* Includes Indexes and Tables of Contents.

** " " Tables of Contents and Advertisements.

The cost of publications has been:

For Paper, Printing, Binding, etc., *Transactions* and *Proceedings*		$9 814.88
For Plates and Cuts		1 451.50
For Boxes, Mailing Lists, Copyright and Sundry Expenses		389.27
For Commission on Advertisements		182.98
For 13 025 copies of Memoirs and Papers		944.46
For List of Members		897.57
For Library Catalogue		1 378.30
For Society House Pamphlet		224.80
For Refunds of Payments for Advertising		141.00
Total		$15 424.76
Deduct amount received for advertisements	$1 201.00	
Deduct amount received for sale of publications	2 901.94	
		4 102 94
Net cost of Publications for 1903		$11 321.82

MEETINGS.

During the year, 23 meetings have been held, as follows: Annual Meeting, 1; at the Annual Convention, 4; regular semi-monthly meetings, 18.

At these meetings, there were presented 20 formal papers, 4 of which were illustrated with lantern slides, and 7 topics for informal discussion.

The Thirty-fifth Annual Convention was held at the Battery Park Hotel, Asheville, N. C., at which the registered attendance numbered 122 members and 133 guests.

MEDALS AND PRIZES.

For the year ending with the month of July, 1902, Prizes were awarded as follows:

The Norman Medal to Gardner S. Williams, M. Am. Soc. C. E., Clarence W. Hubbell, Assoc. M. Am. Soc. C. E., and George H. Fenkell, Jun. Am. Soc. C. E., for their paper entitled "Experiments at Detroit, Mich., on the Effect of Curvature upon the Flow of Water in Pipes."

The Thomas Fitch Rowland Prize to William W. Harts, M. Am. Soc. C. E., for his paper entitled "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government."

No award of the Collingwood Prize for Juniors was made.

FINANCES.

The attention of members is invited to the Secretary's statement of receipts and disbursements, and to the general balance sheet which accompanies it, in which the very satisfactory financial condition of the Society appears.

CONCLUSION.

In concluding the report, the Board is glad to be able to summarize the general condition of the Society as satisfactory in every way. Notwithstanding the payment of $10 000 of the mortgage indebtedness, and the appropriation and payment of $3 000 to a Special Committee for the establishment of an Engineering Headquarters and an Engineering Exhibit by the Society at the St. Louis Exposition, the balance on hand is somewhat larger than that of last year. In addition to this, the Board has felt justified, after the other National Engineering Societies had declined to co-operate in the project, in assuming the entire responsibility for the expense of holding an International Engineering Congress, in connection with the Exposition. This Congress will be held during the week beginning October 3d, 1904, and the visit of members of the Institution of Civil Engineers, which has been arranged for, will be so timed that, after a brief stay in New York as the guests of the Society, all who so desire will be able to attend. It is hoped that all members of the Society will aid the Committee which has been appointed by the Board to organize and conduct this Congress.

The Board has devoted much time to the effort to carry out the instructions of the Asheville Convention, in the preparation of the project for a Union Engineering Building for presentation to the Society. Everything possible has been done to place the project on such a basis that all members may have an opportunity to vote upon it, and the result will be placed before this Annual Meeting, together with arguments for and against participation by the Society. The Board makes no recommendation in this matter, believing that the Society at large should decide what is probably the most important question which it has yet been called upon to determine.

The reports of the Secretary and the Treasurer are appended.

By order of the Board of Direction.

CHAS. WARREN HUNT,
Secretary.

New York, January 5th, 1904.

GENERAL BALANCE SHEET, DECEMBER 31st, 1903.

Accompanying Report of the Secretary.

Assets.			Liabilities.	
Building and Lot (cost)		$191 730.26	Dues for 1904, paid in advance	$13 281.11
Furniture (cost)		16 232 64	Mortgage Debt	55 000.00
Publications on hand (inventoried cost, value)		14 401.85	Funds invested in Society House and Lot, and Library	235 696.51
Library:				
Cash expended for Books, etc.	$8 721.36			
Estimated Value of Donations	42 721 84			
		51 443.20		
Due from Members	$2 373.96			
" " Non-Members	905.17			
		3 279.13		
Cash		26 890.54		
		$303 977.62		$303 977.62

New York, 20th January, 1904.—We have examined the books and accounts of the American Society of Civil Engineers, and certify that the foregoing Balance Sheet is in accordance therewith, as of 31st December, 1903; and, in our opinion, correctly states the condition of the Society's affairs as shewn by the books at that date.

Menzies, Robertson & Co.,
Chartered Accountants.

REPORT OF THE SECRETARY, FOR THE

To the Board of Direction of the

Gentlemen,—I have the honor to present a statement of Re-
December 31st, 1903. I also append a general balance sheet showing
New York, January 5th, 1904.

Receipts.

Balance on hand December 31st, 1902, in Bank and Trust Company and in hands of the Treasurer		$26 297.39
Entrance Fees	$7 025.00	
Current Dues	32 930.35	
Past Dues	1 192.43	
Advance Dues	13 281.11	
Certificates of Membership	281.50	
Badges	1 249.56	
Sales of Publications	2 901.94	
Advertisements	1 201.00	
Interest	647.27	
Library	73.20	
Annual Meeting	1 042.00	
Binding	3 752.49	
Miscellaneous	59.88	
		6 5637.73
		$91 935.12

YEAR ENDING DECEMBER 31st, 1903.

American Society of Civil Engineers.

ceipts and Disbursements for the fiscal year of the Society, ending
the condition of the affairs of the Society.

Respectfully submitted,

CHAS. WARREN HUNT,
Secretary.

Disbursements.

Salaries of Officers	$8 200.00	
Clerical Help	9 423.77	
Caretaking	1 794.42	
Publications	15 100.78	
Postage	3 436.48	
General Printing and Stationery	1 889.62	
Badges	1 112.56	
Certificates of Membership	208.40	
Binding	2 066.60	
Library	943.73	
Maintenance of House	542.47	
Heat, Light and Water	1 242.14	
Betterments	40.00	
Furniture	568.34	
Annual Meeting	1 153.30	
Convention	349.37	
Prizes	146.10	
Advertising Commissions	182.98	
Interest and Insurance	2 400.00	
Louisiana Purchase Exposition	3 000.00	
Committee Work	217.96	
Bond and Mortgage	10 000.00	
Current Business	708.00	
Engineering Congress	3.74	
Refunds	166.00	
Petty Expenses	147.82	
		$65 044.58
Balance on hand, December 31st, 1903:		
In Union Trust Company	$19 162.50	
In Garfield National Bank	6 743.04	
In hands of Treasurer	985.00	
		26 890.54
		$91 935.12

REPORT OF THE TREASURER.

In compliance with the provisions of the Constitution, the Treasurer presents the following report for the year ending December 31st, 1903:

Balance on hand December 31st, 1902			$26 297.39
Receipts from current sources, January 1st to December 31st, 1903			65 637.73
Payment on audited vouchers for current business, January 1st to December 31st, 1903		$52 044.58	
Payment on principal of Bond and Mortgage		10 000.00	
Cash advanced to Committee on Exhibits and Engineering Headquarters, Louisiana Purchase Exposition		3 000.00	
Balance on hand December 31st, 1903:			
In Union Trust Company	$19 162.50		
In Garfield National Bank	6 743.04		
In hands of the Treasurer.	985.00	26 890.54	
		$91 935.12	$91 935.12

Respectfully submitted,

JOS. M. KNAP,
Treasurer, Am. Soc. C. E.

NEW YORK, January 5th, 1904.

ACCESSIONS TO THE LIBRARY.

From December 9th to January 12th, 1904.

DONATIONS.*

WORM AND SPIRAL GEARING.

By Frederick A. Halsey. Second Revised and Enlarged Edition. Boards, 6 x 4 ins., 90 pp., illus. New York, D. Van Nostrand Company, 1903. 50 cents.

It is stated in the preface that justification for the republication of the contents of this book is found in the still prevalent opinion among designers of machinery that worm gearing is necessarily short lived and of low efficiency, and in the fact that the methods of laying out spiral gearing are not as widely understood as the merit and convenience of that form of gearing make desirable. The author believes that the theory of worm gearing is well fortified by the collection of facts from experience given herein, and it points out the procedure to be followed in order to insure durability and efficiency. Both analytical and graphical methods of laying out spiral gearing are given. The solutions relate exclusively to gears having their shafts at right angles. Some of the chapter headings are: Worm Gearing; Theory of Worm Efficiency; Experimental Corroboration of the Theory; Examples from Practice; Limiting Speed and Pressure; Step Bearings; Spiral Gears Compared with Spur Gears; The Speed Ratio; The Preliminary Solution; The Lengths of the Normal Helixes; A Practical Example; Final Solution by Changing the Center Distance; Finding the Pitch of the Tooth Helix; The Selection of the Cutter.

TELEPHONY.

A Manual of the Design, Construction, and Operation of Telephone Exchanges. In Six Parts. Part IV. The Construction of Aerial Lines. By Arthur Vaughan Abbott. Boards, 7 x 6 ins., 14 + 263 pp., illus. New York, McGraw Publishing Company, 1903. $1.50.

Owing to the present increase in quantity of pole line and great decrease in the ratio of wire mileage to line mileage, the design of the pole line of 1903 differs radically from that of 1893, and this volume is an effort to deal with the conditions of the present, with the idea of devoting little space to descriptive matter which is chiefly academic in its nature. Following the plan of the previous parts, the subject is treated in a manner which it is hoped will be of value to the man who is bearing the heat and burden of the day, particularly by supplying much needed information as to costs of construction and the proper rates of maintenance and depreciation. A specification is framed on lines which it is hoped are broad enough to cover all but exceptional cases. The Contents are: Introduction; The Loaded Line; Routes and Rights of Way; Poles; Stresses and the Strength of Poles; Wire Supports and Wire; Distribution; The Cost of Aerial Lines; Disturbances on Telephone Lines; Specification for the Construction of Aerial Lines. There is an index of three pages.

A CALENDAR OF INVENTION AND DISCOVERY.

Compiled by John Cassan Wait. Morocco, 6 x 5 ins., unpaged, illus. McGraw Publishing Company, New York, 1903. Price of cloth copy, $1.00. (Donated by the Author.)

In this book each page of reading matter contains brief biographies of two noted persons who have contributed materially to the industrial progress of the world, and gives briefly the discoveries or inventions made or great works erected or created by them. It also contains two to four poetical quotations, from classic English literature, describing or illustrating the sciences, industrial arts, invention or discovery. The selections have been chosen and applied appropriately to the inventor or discoverer or to the subject in which he wrought or studied. At the bottom of each page are given, in chronological order, the important events leading up to or resulting from the invention or discovery described. The work is intended as an encyclopedia of great men and their doings. It is indexed as to poetry, persons and things.

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* Unless otherwise specified books in this list have been donated to the Library by the publisher,

FOWLER'S ELECTRICAL ENGINEER'S YEAR BOOK AND DIRECTORY OF LIGHT, POWER, & TRACTION STATIONS. 1904.

Boards, 6 x 4 ins., 539 pp., illus. Manchester, Scientific Publishing Company. 1 shilling 6 pence, net.

During the past year the Institution of Electrical Engineers revised the general rules for wiring, and these are embodied in this edition of the Year Book, as are also the various Board of Trade Regulations and Statutory Rules, relating to Tramways, Light Railways and Electric Lighting. Numerous tables of data have been interpolated, with a view of enriching the text which in many parts has been largely rewritten, as in the case of the sections on "Measuring Instruments," "Electric Distribution," "Meters," "Dynamos," etc., while new matter on Polyphase Transmission and Induction Motors is included. The yearly revision has been made in the directory of electric light, power and traction stations of the United Kingdom, which forms an annually increasing section of the book. The particulars of station plant, equipment, and staff of more than five hundred installations are given, and an effort has been made to bring the information up to date.

AMERICAN METER PRACTICE.

By Lyman C. Reed. Cloth, 9 x 6 ins., 196 pp., illus. New York, McGraw Publishing Company, 1903. $2.00.

In this book an effort has been made to outline the underlying principles of operation and practice, and leave the minor details to be worked out to suit local conditions. In describing only a few meters the author's object is to select one each of well known and representative types. Chapter XIII, on How to Read Meters, is intended to interest the consumer of power who is not a technical man. It will enable him to figure out and check up his meter bills. The chapter headings are: Measurement of Power in Direct Current Circuits; Measurement of Power in Alternating Current Circuits; Meter Selection; Torque and Friction; The Edison Chemical Meter; The Thomson Recording Wattmeter; The Duncan Recording Wattmeter for Alternating Current; The Duncan Wattmeter for Direct Current; The Stanley Recording Wattmeter; The Guttman Wattmeter; The Westinghouse Induction Meter; General Management of the Meter Department; Records; Testing; General Policy; Reading Meters; Value of Losses in Meters Relative to Income; Differential Rating; Elements of Photometry.

EXPERIMENTAL RESEARCHES ON REINFORCED CONCRETE.

By Armand Considère. Translated and Arranged by Leon S. Moisseiff, Assoc. M. Am. Soc. C. E. With an Introduction by the Translator. Cloth, 9 × 6 ins., 9 + 188 pp., illus. New York, McGraw Publishing Company, 1903. $2.00.

The researches, the results of which are given in this book, were undertaken in the year 1898, and cover the time from that date to the end of 1902. The first published report of the results obtained is found in a paper by the experimenter before the French Academy of Sciences at the end of 1898. As the work proceeded M. Considère published a number of papers containing the results of his labors. This book consists of a compilation of these publications arranged and classified so as to make, as far as possible, one coherent treatise. It has been the intent of the translator to adhere to the author's wording and treatment, avoiding at the same time unnecessary repetitions. The chapters of the book, as will be seen, follow in general, the titles of the several papers as they were published, and also their chronological order. This arrangement appeared to be the best, containing, as each paper does, the further development of the author's ideas. The Contents are: Reinforced Concrete in Bending; The Deformation and Testing of Reinforced Concrete Beams; Effects of Changes in Volume of Concrete; Tensile and Compressive Resistance of Concrete; Resistance of Concrete to Shearing and Sliding; Effects of Cracks on Stresses and Deformations; The Compressive Resistance of Reinforced and Hooped Concrete.

THE MECHANICAL ENGINEER'S REFERENCE BOOK.

A Hand-Book of Tables, Formulas and Methods for Engineers, Students, and Draftsmen. By Henry Harrison Suplee, M. Am. Soc. M. E. Leather, 7 × 4 ins., 12 + 834 pp., illus. Philadelphia and London, J. B. Lippincott Company, 1904. $5.50 net. Without thumb index, $5.00.

The preface states that the many and varying rules and formulas in connection with mechanical engineering have been examined, and only those which, in the judgment of the author, are most generally applicable have been given. As the metric system has been under active discussion of late, many of the tables have been presented in both British and metric units. Among these tables may be mentioned the metric steam tables, which render it convenient to make steam computations in the metric system. This work is intended to be a successor to the well-known pocket-book written many years ago by the late John W. Nystrom. Certain information therein contained has been utilized, with such modifications as are necessary to meet the engineering problems and needs of the day. The Contents are: Mathematics; Mechanics; Materials of Engineering; Strength of Materials; Machine Design; Heat; Air; Water; Fuel; Steam; Steam Boilers; Steam Engines; Internal-Combustion Motors; Electric Power; The Cost of Power; Works Management; Appendix. The volume is supplied with a patent thumb index intended to facilitate reference.

THE POLAR PLANIMETER AND ITS USE IN ENGINEERING CALCULATIONS.

Together with Tables, Diagrams and Factors for the Immediate Adjustment of the Instrument for the Solution of Problems Involving: The Measurement of Large and Small Areas, Average or Mean Height of Indicator and Similar Diagrams, Determination of Centre of Gravity, Measurement of Volumes of Railway and Canal Excavation, Volumes in Grading and Dredging Operations, Volumes in Reservoir and Similar Design and Construction, Quantities and Volumes of Brickwork, Weights of Iron and Other Metals in Construction, Measurement of Displacement Diagrams, etc., etc., etc. By J. Y. Wheatley. Cloth, 9 x 6 ins., 114 pp., illus. New York, Keuffel & Esser Co. $3.00. (Donated by Carl M. Bernegau.)

The publication of this work is the direct result of the author's experience at the time of his first purchase of a planimeter, as he was unable to find any treatise on the subject which would give him the information necessary to make an intelligent use of the instrument. This led at once to a study, first of the theory of the planimeter, and then of the engineering problems to the solution of which that theory could be applied.

Gifts have also been received from the following:

Am. Inst. Min. Engrs. 1 pam.
Atlantic Coast Line R. R. Co. 2 pam.
Binghamton, N. Y.—City Engr. 1 pam.
Boston, Mass.—Transit Comm. 1 bound vol.
British Fire Prevention Committee. 4 pam.
Cleveland, Ohio—City Council. 1 bound vol.
Cole, W. W. 1 vol.
Cunningham, A. C. 1 pam.
Fisk, W. L. 1 map, 1 pam.
Follett, W. W. 2 bound vol.
Great Britain—Patent Office. 9 pam., 1 vol.
Henderson, J. B. 7 pam.
Indian Midland Ry. Co., Ltd. 1 pam.
Inst. of Civ. Engrs. 2 bound vol., 1 pam.
Inst. of Min. & Metallurgy. 10 bound vol.
Iowa Central Ry. Co. 2 pam.
Kansas City Southern Ry. Co. 1 pam.
Ky.—Inspector of Mines. 1 bound vol.
Lindenthal, Gustav. 5 pam., 3 drawings.
London, Ont.—Water Commrs. 1 pam.
Long Island R. R. Co. 1 pam.
Low, Emile. 1 blue print.
Madras—Pub. Works Dept. 1 pam.
Mead, Elwood. 1 pam.
New England Assoc. of Gas Engrs. 1 bound vol.
New South Wales—Ry. Commrs. 1 bound vol.
N. Y.—State Library. 4 bound vol.
Newlands, F. G. 1 pam.
Oesterr. Ingenieur- und Architekten-Verein. 1 pam.
Osgood Dredge Co. 3 photo.
Poetsch, C. J. 1 vol.
Ry. Signal Assoc. 1 pam.
Richardson, Clifford. 1 pam.
Rutland R. R. Co. 1 pam.
South Australia—Rys. Commr. 1 pam.
Tonindustrie-Zeitung. 1 bound vol., 1 vol.
U. S. Commr. of Education. 1 bound vol.
U. S. Commr. of Navigation. 1 bound vol.
U. S. Geological Survey. 2 bound vol., 4 pam.
U. S. Ordnance Dept. 12 bound vol.
U. S. War Dept. 13 specif.
U. S. War Dept. Lib. 8 bound vol.
U. S. Weather Bureau. 1 pam.
Università Romana. 1 vol.
Victoria—Agent General. 12 bound.
Waddell, Montgomery. 1 vol.
Western Australia—Commr. of Rys. 1 pam.

BY PURCHASE.

The Electrician: A Weekly Illustrated Journal of Electrical Engineering, Industry and Science. Oct. 25, 1901–Dec. 25, 1903. 4 vol. London, 1901–03.

A Text-Book of Electrical Machinery. Vol. I. Electric, Magnetic, and Electrostatic Circuits. By Harris J. Ryan, M. Am. Inst. E E., M. Am. Soc. M. E.; Henry H. Norris, Assoc. M. Am. Inst. E. E., and George L. Hoxie, Assoc. M. Am. Inst. E. E., Jun. Am. Soc. M. E. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1903.

Handbuch der Ingenieurwissenschaften. Vol. I, Pt. 4. Dritte vermehrte Auflage. Leipzig, Wilhelm Engelmann, 1903.

Die Eisenkonstruktionen der Ingenieur-Hochbauten. Ein Lehrbuch zum Gebrauche an technischen Hochschulen und in der Praxis. Von Max Foerster. Erganzungsband zum Handbuche der Ingenieurwissenschaften. Zweite, verbesserte und vermehrte Auflage. Leipzig, Wilhelm Engelmann, 1903.

The Tribune Almanac and Political Register, 1904. New York, The Tribune Association, 1904.

The Purification of Sewage and Water. By W. J. Dibdin. Third Edition, Revised and Enlarged. London, The Sanitary Publishing Company, Limited; New York, D. Van Nostrand Company, 1903.

Wood. A Manual of the Natural History and Industrial Applications of the Timbers of Commerce. By G. S. Boulger. London, Edward Arnold, 1902.

De l'Emploi du Bouclier dans la Construction des Souterrains. Par Raynald Legouëz. Paris, Baudry et Cie., 1897.

SUMMARY OF ACCESSIONS.

December 9th, 1903, to January 12th, 1904.

Donations (including 17 duplicates)	136
By purchase	11
Total	147

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Beugler, Edwin James. Res. Engr., The Boston Terminal Co., 220 South Station, Boston, Mass.	Jun. Assoc. M. M.	June 19, 1891 Feb. 1, 1899 Jan. 5, 1904
Bloss, Richard Parkhurst. Res. Engr., The Duncan Co., Mechanicsville, N. Y.		Jan. 6, 1904
Brownell, Ernest Henry. Civ. Engr., U. S. N., Navy Yard, Portsmouth, N. H.	Assoc. M. M.	Jan. 1, 1896 Jan. 5, 1904
Burden, James. 3 Locust Ave., Troy, N. Y.	Assoc. M. M	Feb. 5, 1902 Jan. 5, 1904
Coleman, Frederick Albert. Supt., Bellington & Northern R. R. Co.; Valley Coal & Coke Co., Bellington, W. Va.	Jun. Assoc. M. M.	April 4, 1893 April 5, 1899 Dec. 1, 1903
Dose, Henry Frederick. Res. Engr., Penn., N. Y. & L. I. R. R. Co., East River Div., 225 West 33d St., New York City		Jan. 6, 1904
Fay, Frederic Harold. Asst. Engr., Eng. Dept., 60 City Hall, Boston, Mass.	Jun. Assoc. M. M.	Oct. 2, 1894 April 2, 1902 Jan. 5, 1904
Green, Hubert Edward. Engr., U. S. Geological Survey, Div. of Hydrography, 431 Rialto Bldg., San Francisco, Cal.		Dec. 2, 1903
Kops, Julian de Bruyn. Civ. Engr. and Archt., 18 Board of Trade Bldg., Savannah, Ga.	Assoc. M. M.	April 4, 1894 Jan. 5, 1904
Mead, Charles Adriance. 165 Wildwood Ave., Upper Montclair, N. J	Assoc. M. M.	April 5, 1899 Jan 5, 1904
Mitchell, Charles Hamilton. Asst. Engr., Ontario Power Co., Niagara Falls, Ont., Canada.	Assoc. M. M.	June 4, 1902 Jan. 5, 1904
Scripture, Arthur Marquis. New Hartford, N. Y.	Assoc. M. M.	June 3, 1896 Jan. 5, 1904

ASSOCIATE MEMBERS.

Allen, Walter Hinds. Civ. Engr., U. S. N., Navy Yard, Brooklyn, N. Y.	Jun. Assoc. M.	May 1, 1900 Nov. 4, 1903
Barrows, Harold Kilbreth. Assoc. Prof., Civ. Eng., Univ. of Vermont, Burlington, Vt		Jan. 6, 1904
Bowman, Joseph Hockman. Chf. Engr., Pan-American R. R., Tonalá, Chiapas, Mexico		Dec. 2, 1903
Campbell, Arthur Ira. Div. Engr., St. L. & San Fran. R. R. Co., Granite Blk., St. Louis, Mo.		Dec. 2, 1903
Cole, Herbert Nichols. 721 Van Buren St., Milwaukee, Wis.		Jan. 6, 1904
Cresswell, Herbert Augustine. Res. Engr., Western Australian Govt. Rys., Geraldton, Western Australia		Oct. 7, 1903
Cummings, Elmore David. 918 East 20th St., Baltimore, Md.		Nov. 4, 1903

		Date of Membership.
Glazier, William Leonard. Engr. and Supt., Newport Water-Works, Newport, Ky		Oct. 7, 1903
Hamlin, William Eliot. Chf. Engr., Frank B. Gilbreth, Gen. Contr., Park Row Bldg., New York City		Dec. 2, 1903
Murray, Charles Warren. City Engr. and Supt. of Water-Works, City Hall Bldg., Americus, Ga		Dec. 2, 1903
Pfau, Julius Welch. 510 Second Ave., Troy, N. Y		Dec. 2, 1903

ASSOCIATES.

Colby, Safford Kinkead. Contr. Engr. and Mgr., Eastern Office, The Pittsburg Reduction Co., 99 John St., New York City	Jun. Assoc.	Mar. 5, 1895 Jan. 6, 1904

JUNIORS.

Becker, Sylvanus A. Box 732, Connellsville, Pa	Dec. 1, 1903
Chadbourne, Edward Merriam. Chf. Engr., Albuquerque Traction Co., Albuquerque, N. Mex	Nov. 3, 1903
Cotton, Miles Penner. C. P. R. R. Constr. Dept., Winnipeg, Man., Canada	Oct. 6, 1903
Foss, John Harrison. With Hamakua Ditch Co., Huelo, Maui, Hawaii	Dec. 1, 1903
Gilman, Charles Edward. Asst. Engr., Bay Cities Water Co., 10th Floor, Mutual Savings Bank Bldg., San Francisco, Cal	Oct. 6, 1903
Haehl, Harry Lewis. Asst. Engr., Bay Cities Water Co., Coyote, Santa Clara Co., Cal	Oct. 6, 1903
Hamlin, Ralph. Structural Designer, International Paper Co., 30 Broad St., New York City	Jan. 5, 1904
Hopkins, George Gallagher, Jr. Insp. for the N. Y. Board of Fire Underwriters. Address, 350 Washington Ave., Brooklyn, N. Y	Jan. 5, 1904
McBurney, Henry. 1409 Locust St., Philadelphia, Pa	Jan. 5, 1904
Tatlock, James Lloyd. Asst. Engr., Sewer Comm., City Hall, New Rochelle, N. Y	Sept. 1, 1903

RESIGNATIONS.

MEMBERS.	Date of Resignation.
Hoech, Theodor Gottlieb	Dec. 31, 1903
Miller, James Imbrie	Dec. 31, 1903

ASSOCIATE MEMBERS.

Crabbs, Clarence Lincoln	Dec. 31, 1903

ASSOCIATES.

Sawyer, Jacob Herbert	Dec. 31, 1903

DEATHS.

Bogart, James Peter........Elected Junior, January 4th, 1882; Member, July 3d, 1895; died December 24th, 1903.

Fisher, Clark...............Elected Member, October 19th, 1870; died December 31st, 1903.

Ives, Edward Bernard......Elected Member, April 5th, 1893; died December 30th, 1903.

Reed, William W...........Elected Fellow, December 20th, 1872; died January 10th, 1904.

Shanks, Thomas Pearman....Elected Member, May 2d, 1888; died January 7th, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(December 9th, 1903, to January 12th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.
(69) *Mill Owners*, New York City, 10c.
(70) *Engineering Review*, New York City, 10c.
(71) *Journal*, Iron and Steel Inst., London, England.
(73) *Electrician*, London, England, 18c.

LIST OF ARTICLES.

Bridge.

Reconstruction of a Bridge on the Midland Railway, across the River Trent.* Frank Horace Frere, Assoc. M. Inst. C. E. (63) Vol. 154.

The Protection Works of the Kaisar-i-Hind Bridge over the River Sutlej, near Ferozepur. Amyas Morse, M. Inst. C. E. (63) Vol. 154.

The Superstructure for the Manhattan Bridge across the East River at New York City.* (13) Dec. 10.

Wabash Steel Concrete Construction.* (40) Dec. 11.

Moving a Seine Bridge.* (12) Dec. 11.

Concrete-Steel Arch Bridge for the C. B. & Q. Ry., at Plano, Ill.* (18) Dec. 12; (15) Dec. 11; (14) Jan. 2; (40) Dec. 11.

Towers and Anchorages of the Manhattan Bridge, New York.* (14) Dec. 12.

The Williamsburg Bridge across the East River at New York City.* (13) Dec. 17.

The Williamsburg Bridge and the Brooklyn Bridge.* (15) Dec. 18.

Moving the Passy Bridge, Paris. (14) Dec. 19.

The Main Span of the Williamsburg Bridge, across the East River, New York City.* (14) Serial beginning Dec. 19.

The Opening of the New East River Bridge, New York.* (19) Dec. 19.

A Concrete Arch Bridge with Bar and Stirrup Reinforcement.* (13) Dec. 31.

The Use of Scows and Sand Jacks in Moving and Lowering a 1 000-Ton Draw-Bridge over the Passaic River, at Newark, N. J.* Lincoln Bush. (13) Dec. 31; (20) Dec. 31; (40) Jan. 1; (15) Jan. 1.

A Proposed Plan for Rebuilding the Brooklyn Bridge.* (13) Jan. 7.

Pivot Pier Caisson and Operating Machinery for a Heavy Swing Bridge.* (13) Jan. 7.

Steel Concrete Abutments and Solid Floors for Railroad Bridges. A. O. Cunningham, M. Am. Soc. C. E. (15) Jan. 8.

Electrical.

The Measurement of Electrical Conductivity.* Rollo Appleyard, Assoc. M. Inst. C. E. (63) Vol. 154.

The Measurement of Power in Alternating Circuits.* Patrick Hamilton, Assoc. M. Inst. C. E. (63) Vol. 154.

Switchboard Construction for Isolated Electric Plants.* (64) Dec.

Electrical Development in Siberia.* L. Lodian. (64) Dec.

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Les Heurtoirs Hydrauliques de la Gare d'Anvers G. C.: Système Hoppe.* L. Cosyn (34) Dec.

Système Nouveau pour Revêtement de Talus de Tranchées de Chemins de Fer, Routes, etc. M. A. Casse. (30) Dec.

Note sur les Appareils Électriques pour la Commande des Aiguilles et des Signaux (Système Ducousso et Rodary).* M. Rodary. (38) Dec.

Frein Automatique a Air Comprimé: Système Lipkowski. F. Barbier.* (33) Dec. 5.

Les Locomotives pour Voie Etroite avec Fortes Rampes et Courbes de Faible Rayon.* R. Bonnin. (36) Dec. 10.

Construction de Tunnels en Terrains Immergés.* (33) Dec. 26.

Railroad, Street.

Tramroads in Connection with Street Tramways.* Harry Ernest Prescott, M. Inst. C. E. (63) Vol. 154.

The Effect of Multiple Control on the Traction Problem of Pittsburg. N. W. Storer. (58) Nov.

Durban (S. Africa) Electric Light and Tramways.* (26) Serial beginning Dec. 11.

Interurban Electric Traction Systems—Alternating Versus Direct-Current. Paul M. Lincoln. (27) Dec. 12.

Economies Introduced by the Use of the Automotoneer. (17) Dec. 12.

Electric Heating of Third Rails for Sleet Removal.* (17) Dec. 12.

European Single-Phase Railway Motor.* (17) Dec. 12.

Working Results on the City and South London Railway.* (73) Serial beginning Dec. 18.

The Winter-Eichberg Single-Phase Railway System.* (27) Dec. 19.

Improvements on a Kentucky System.* (17) Dec. 19.

Alternating Motors for Railway Service. Louis Bell. (17) Dec. 19.

The Rolling Stock of the Great Northern and City Railway.* (12) Dec. 25.

The City and South London Railway. P. V. McMahon. (Abstract of Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Dec. 26; (26) Serial beginning Dec. 25.

Electric Traction by Monophase Current.* Emile Guarini. (19) Dec. 26.

An Improved Method of Subaqueous Construction at the Harlem River Crossing of the New York Rapid Transit Railroad.* (14) Dec. 26.

Application of Single-Phase Alternating Current for Traction and Railway Service. B. G. Lamme. (27) Dec. 26; (17) Dec. 26.

New Interurban Railway in Switzerland.* (17) Dec. 26.

Repair Shop Practice on the Camden & Suburban Road.* (17) Dec. 26.

The Evolution of the Electric Railway Motor. S. T. Dodd. (Abstract of Paper read before the New York Elec. Assoc.) (17) Dec. 26.

Alternating Current for Signaling on Interurban Electric Railways.* (17) Dec. 26.

Tram-Rail Joints.* (21) Jan.

A New System for a Track Circuit.* (40) Jan. 1.

Electric Traction with Alternating Currents. A. C. Eborall. (Paper read before the Inst. of Elec. Engrs.) (47) Serial beginning Jan. 2; (26) Serial beginning Jan. 1; (73) Serial beginning Dec. 18.

Arnold Electro-Pneumatic Railway System—Lansing, St. Johns & St. Louis Ry.* (18 Jan. 2; (15) Jan. 1; (40) Jan. 8.

Semi-Convertible Cars for the Public Service Corporation of New Jersey.* (17) Jan. 2.

The Arnold Electro-Pneumatic Railway System as Employed on the Lansing, St. Johns and St. Louis Railway.* Bion J. Arnold, M. Am. Inst. E. E. (27) Jan. 2; (19) Jan. 9; (17) Jan. 2; (13) Jan. 7.

The Jackson & Battle Creek Railway.* W. G. Fargo. (17) Jan. 2.

The Street Railway System of Richmond, Va.* (17) Jan. 2.

The Steam-Hydraulic Plant of the Virginia Passenger & Power Company, Richmond.* (14) Jan. 2.

Combination Snow-Plow and Freight Car.* (17) Jan. 9.

Inter-Urban Electric Traction Systems. (18) Serial beginning Jan. 9.

Controleur Électropneumatique: Système Westinghouse.* (33) Nov. 28.

Sanitary.

Inverted Syphons in the Sewerage System of Newton, Mass.* Irving T. Farnham. (60) Dec.

Plumbing in the Stable of Col. Daniel S. Lamont, New York.* (70) Dec.

Sewage Disposal in Iowa.* A. Marston. (4) Dec.

The Experimental Bacterial Treatment of London Sewage. Frank Clowes. (60) Dec.

A Comparison of Chemical and Septic Tank Systems as Preludes to Artificial Filtration. Douglas Archibald. (Abstract of Paper read before the British San. Inst.) (60) Dec.

The Typhoid Fever Epidemic at Butler, Pa.* George A. Soper, Assoc. M. Am. Soc. C. E. (13) Dec. 24.

The Farington Sewage Disposal Works. (14) Dec. 26.

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* Illustrated.

Sanitary—(Continued).

The Septic Tank for the Treatment of Sewage at the Soldiers' Home near Santa Monica, Cal.* James D. Schuyler. (60) Jan.
The Sanitary Disposal of Municipal and Institutional Waste by Cremation.* W. F. Morse. (Abstract of Paper read before the Amer. Public Health Assoc.) (60) Jan.
Ventilation and Heating in the Penobscot County Court House, Bangor, Maine.* (14) Jan. 2.
Water Supply and Drainage Systems in the Lorraine Hotel, New York.* (14) Jan. 9.
Bains Populaires.* (36) Dec. 10.

Structural.

The Decay of Metals.* James Tayler Milton, M. Inst. C. E., and William James Larke. (63) Vol. 154.
Concrete-Metal Construction.* Emile Villet. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Oct.
Portland Cement Manufacture. Edwin C. Eckel. (60) Serial beginning Dec.
Iron Roofs for Gas-Works.* Norton H. Humphrys, Assoc. M. Inst. C. E. (66) Dec. 8; (24) Dec. 28.
A Suspended Curved Double Stairway of Reinforced Concrete.* (14) Dec. 12.
The Concrete-Steel Stadium on the Athletic Field of Harvard University.* (14) Dec. 12.
Concrete-Steel Columns for Reinforcing an Old Building.* Keith O. Guthrie. (13) Dec. 17.
Raising a Brick Dwelling One Hundred and Sixty Feet.* (14) Dec. 19.
The New Flues and Stack at Anaconda.* (16) Dec. 24.
The New Worthington Hydraulic Works at Harrison, N. J.* (13) Dec. 31.
Structural Details of the Kuhn-Loeb Building, New York.* (14) Jan. 2.
The Effect on the Tensile Strength of Cement of Removing Briquettes from Water for Varying Lengths of Time before Breaking. J. L. Van Ornum, M. Am. Soc. C. E. (13) Jan. 7.
Underpinning a Corner Column on a Slender Pier.* (14) Jan. 9.
Fabrication du Ciment Portland Artificiel.* A. Morel. (33) Serial beginning Nov. 28.
Usine à Chaux Hydraulique et Ciment de Grappier, de la Société Anonyme des Chaux de Galeria (Corse).* J. Boero. (35) Dec.
Petites Maisons Jumelles, Rue Masset, à Vichy (Allier).* E. Rivoalen. (35) Dec.

Topographical.

The Use of a Logarithmic Scale in Plotting Curves.* Russell Scott Scholefield, Assoc. M. Inst. C. E. (63) Vol. 154.
Two Problems in Field Engineering.* Arnold Emch. (13) Dec. 31.

Water Supply.

Siphon for the Guernsey Water-Works.* Gerrard Hatfield Perryn, Assoc. M. Inst. C. E. (63) Vol. 154.
New Lanarkshire Middle-Ward District Water-Works.* William Archer Porter Tail. (63) Vol. 154.
Empirical Formulas for Finding the Maximum Discharges of Rivers. Robert Hunter Rhind, M. Inst. C. E. (63) Vol. 154.
Rainfall and Run-Off of New England, Atlantic Coast and Southwestern Colorado Streams. William O. Webber. (1) Nov.
How Cleveland is Checking Water Waste. (60) Dec.
A Gas Engine Pumping Station.* (64) Dec.
The Water-Works of Erie, Pa.* (60) Dec.
The Water Supply in the Blair Building, New York.* (70) Dec.
A New Disk Meter for Water Service.* (70) Dec.
The Kennicott Water Softener.* (11) Dec. 11.
Architectural Features of Masonry Dams.* (14) Dec. 12.
The New Water Supply Tunnel of Cleveland, Ohio. Charles Goffing. (14) Dec. 12.
Cofferdam for the 39th Street Pumping Station at Chicago.* (13) Dec. 17.
The Walden Pond Dam of the Lynn Water-Works.* George I. Leland. (14) Dec. 19.
The Storage of Flood Water. Henry Robinson, M. Inst. C. E. (Paper read before the British Assoc. of Water-Works Engrs.) (66) Dec. 22.
An Inquiry into the Working of Various Water-Softeners. C. E. Stromeyer, M. I. Mech. E., and W. B. Baron. (12) Serial beginning Dec. 25; (22) Dec. 25; (11) Dec. 25.
New Water Supply for Margate.* (12) Dec. 25.
The Mechanical Filter Plant for the Danville Water Company.* (14) Dec. 26.
A New Reservoir for the Hoylake and West Kirby Gas and Water Company. Alfred J. Jenkins, Assoc. M. Inst. C. E. (Abstract of Paper read before the British Assoc. of Water-Works Engrs.) (66) Dec. 29.
The Failures and the Possibilities of Water Filtration. Allen Hazen, M. Am. Soc. C. E. (13) Dec. 31.
The Cincinnati Water-Works Tunnel.* Paul G. Brown, M. W. Soc. C. E. (13) Dec. 31.
The Clarification of Ohio River Water at Cincinnati. Frank J. Kelley. (Paper read before the Central States Water-Works Assoc.) (60) Jan.
The Belmont Filtration Works.* John W. Hill. (3) Serial beginning Jan.
Water Supply and Drainage Systems in the Lorraine Hotel, New York.* (14) Jan. 9.

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* Illustrated.

Topographical—(Continued).

The Conduit of the Jersey City Water Supply Company.* (14) Serial beginning Jan. 9.
The Filter Galleries for the Water-Works of Laredo, Texas. A. L. McLane. (14) Jan. 9.
Barrage en Terre de Tabeaud près de Jackson (Californie).* G. Richon. (33) Dec. 19.

Waterways.

The Protection Works of the Kaisar-i-Hind Bridge over the River Sutlej, near Ferozepur. Amyas Morse, M. Inst. C. E. (63) Vol. 154.
The Haskell Self-Registering Water Gauge.* G. A. M. Liljencrantz. (4) Dec.
Dredging Plant and Clyde Improvement.* (12) Dec. 18.
A New Station for the Rating of Current Meters by the U. S. Geological Survey, at Denver, Colorado.* M. C. Hinderlider. (14) Dec. 19.
The Solution of the Isthmian Canal Problem. Henry L. Abbot. (9) Jan.
Organization and Personnel in the Building of the Panama Canal. Fullerton L. Waldo. (9) Jan.
Raising the Grade of Galveston.* (15) Jan. 1.
Argentine Rivers.* E. L. Corthell, M. Am. Soc. C. E. (13) Jan. 7.
Electricity on the Miami and Erie Canal.* (46) Jan. 9.
Le Port d'Escale de Zeebrugge.* Charles Piens. (30) Dec.
Notice sur un Système de Revêtement en Dalles a Emboîtements pour la Consolidation des Talus des Digues des Canaux et Rivières et des Digues de Mer. J. Conard. (30) Dec.
Notice sur les Derniers Travaux Exécutés aux Ports de Gênes et de Venise.* G. B. Antonelli. (30) Dec.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 2.

FEBRUARY, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1904.

Entered according to Act of Congress, by the American Society of Civil Engineers in the office of the Librarian of Congress, at Washington.

American Society of Civil Engineers.

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JAMES D. SCHUYLER.

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S. L. F. DEYO.

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Treasurer, JOSEPH M. KNAP.

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Term expires January, 1905:
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CHARLES D. MARX.

Assistant Secretary, T. J. McMINN.

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THE PRESIDENT OF THE SOCIETY IS *ex-officio* MEMBER OF ALL COMMITTEES.

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◆

The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER, - - 533 Columbus.
CABLE ADDRESS, - - - - "Ceas, New York."

Vol. XXX. FEBRUARY, 1904. No. 2.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

FIFTY-FIRST ANNUAL MEETING.*

January 20th, 1904.—The meeting was called to order at 10.15 A. M.; President Alfred Noble in the chair; Charles Warren Hunt, Secretary; and present, also, about 300 members.

The reading of the minutes of the meeting of January 6th, 1904, was dispensed with.

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* A full report of the Fifty-first Annual Meeting is printed on pages 51 to 93 of this number of *Proceedings*.

Messrs. A. W. Trotter, H. M. Rood and B. C. Collier were appointed tellers to canvass the Ballot for Officers for the ensuing year.

The Annual Report of the Board of Direction and the Annual Reports of the Secretary and of the Treasurer* for the year ending December 31st, 1903, were presented, and, on motion, duly seconded, accepted and placed on file.

The following were appointed members of the Nominating Committee for two years:

ALBERT CARR	*Representing*	*District*	*No. 1.*
FREDERICK BROOKS	"	"	*No. 2,*
H. A. VAN ALSTYNE	"	"	*No. 3.*
H. R. LEONARD	"	"	*No. 4.*
JOSEPH B. DAVIS	"	"	*No. 5.*
G. B. NICHOLSON	"	"	*No. 6.*
FRANKLIN RIFFLE	"	"	*No. 7.*

A progress report† from the Special Committee on Uniform Tests of Cement was read by the Secretary.

On motion, duly seconded, the report was received, placed on file, and the Committee continued.

The Secretary reported that the Board of Direction had awarded the prizes for the year ending with the month of July, 1903, in accordance with the recommendations of the Committee appointed for that purpose, as follows:

That no award of The Norman Medal be made;

That The Thomas Fitch Rowland Prize be awarded to Paper No. 954, "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey," by George W. Fuller, Assoc. M. Am. Soc. C. E.;

That The Collingwood Prize for Juniors be awarded to Paper No. 939, "The Footbridge for Building the Cables of the New East River Bridge," by Isaac Harby,‡ Jun. Am. Soc. C. E.

The Secretary presented a special report as to the Engineering Congress and the Society Convention.§

On motion, duly seconded, the report was received and ordered placed on file.

The Secretary presented a special report‖ from the Board of Direction in the matter of the appointment of a Special Committee on "Concrete and Steel-Concrete."

On motion, duly seconded, it was carried by a two-thirds vote to refer the matter to the membership for letter-ballot.

The Secretary presented the special report of the Board of Direction on the action of the Society on the proposed Union Engineering Building.*

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* The Annual Reports of the Board of Direction, the Secretary and the Treasurer, may be found on pages 7 to 16 of the *Proceedings* for January, 1904 (Vol. XXX).

† See page 55.

‡ Mr. Harby has since been elected an Associate Member.

§ See page 57.

‖ See page 58.

The President made a statement in reference to a subsequent interview with Mr. Andrew Carnegie.†

The Secretary read a letter‡ from William D. Pickett, M. Am. Soc. C. E., in reference to the proposed Union Engineering Building.

The adoption of the following resolutions, offered by the Board of Direction, was moved, seconded and carried:

(1) *Resolved*, That the Board of Direction be instructed to issue a letter-ballot, to be canvassed at the Meeting of the Society, March 2d, 1904, on the question whether this Society shall become one of the Constituent Societies in the occupancy and control of the proposed Union Engineering Building, under the terms outlined by the Joint Conference Committee.

(2) *Resolved*, That should a majority of the votes cast be favorable, the Board is authorized to proceed in the matter, provided the exemption from taxation of the proposed building is assured, and the interests of the Society are otherwise fully safe-guarded.

The Secretary presented the report§ of the tellers appointed to canvass the Ballot for Officers for the ensuing year.

The President announced the election of the following officers:

President, to serve one year:

Charles Hermany, Louisville, Ky.

Vice-Presidents, to serve two years:

F. S. Curtis, Boston, Mass.
S. L. F. Deyo, New York City.

Treasurer, to serve one year:

Joseph M. Knap, New York City.

Directors, to serve three years:

District No. 1.—Charles S. Gowen, Ossining, N. Y.
District No. 1.—N. P. Lewis, New York City.
District No. 2.—John W. Ellis, Woonsocket, R. I.
District No. 4.—George S. Webster, Philadelphia, Pa.
District No. 5.—Ralph Modjeski, Chicago, Ill.
District No. 7.—Charles D. Marx, Stanford University, Cal.

Mr. Croes and Mr. Cartwright conducted Mr. Hermany, the President-elect, to the chair.

Mr. Hermany addressed the meeting briefly.

Adjourned.

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* See page 99.

† See page 60.

‡ See page 61.

§ See page 84.

February 3d, 1904.—The meeting was called to order at 8.40 P. M., Alfred Craven, Director, in the chair; Charles Warren Hunt, Secretary; and present, also, 75 members and 11 guests.

The minutes of the meeting of January 6th, 1904, were approved as printed in *Proceedings* for January, 1904. The approval of the minutes of the Annual Meeting was deferred until they are printed in the *Proceedings* for February, 1904.

A paper, by R. A. Thompson, Assoc. M. Am. Soc. C. E., entitled "Method Used by the Railroad Commission of Texas, Under the Stock and Bond Law, in Valuing Railroad Properties," was presented by the Secretary, who also presented a communication on the subject from E. L. Corthell, M. Am. Soc. C. E.

The subject was discussed by Messrs. J. G. Tait, F. Lavis and W. H. Coverdale.

The Secretary presented a communication from the St. Louis Engineers' Club, inviting members of the Society to use the rooms of the club during the St. Louis World's Fair.

Ballots for membership were canvassed, and the following candidates elected:

AS MEMBERS.

WILLIAM BULLARD ALLEN, Birmingham, Ala.
THOMAS HENRY HANDBURY, San Francisco, Cal.
VIRGIL HENRY HEWES, New York City.
HENRY LLOYD LYON, Buffalo, N. Y.
WILLIAM HORATIO SANDERS, Los Angeles, Cal.
GEORGE EDWARD SLEEPER, Boston, Mass.
GEORGE ARTHUR ZINN, Wheeling, W. Va.

AS ASSOCIATE MEMBERS.

ROBERT JAY BASSETT, South Chicago, Ill.
HAROLD SHERBURNE BOARDMAN, Orono, Maine.
HARRY GILBERT BURROWES, Brooklyn, N. Y.
JOHN BOBBS CAMERON, Newcastle, Pa.
EDWARD COTMAN CLARK, New York City.
PHILIP INSLEY CRAIG, Flemington, N. J.
DE FOREST HALSTED DIXON, Brooklyn, N. Y.
ALFRED KIMBALL DOWNES, New York City.
LINDSAY DUNCAN, Boulder, Colo.
CARL HAMILTON FULLER, Steelton, Pa.
RICHARD ALEXANDER GIVEN, Memphis, Tenn.
WILLIAM GRANVILLE GOVE, Brooklyn, N. Y.
WILLIAM KELLY, New London, Conn.

George Gere MacCracken, New York City.
Ogden Merrill, Brooklyn, N. Y.
Clarence Warren Noble, Kansas City, Mo.
Harry Thomas Paterson, Colorado Springs, Colo.
James Wilson Pierce, Cambridge, Mass.
Edward Nathan Prouty, Berkeley, Cal.
Amos Schaeffer, New York City.
Charles Bruce Scott, Pittsburg, Pa.
Walter Evans Spear, New York City.
Alexander Thomson, Jr., Brooklyn, N. Y.
Thomas MacIntire Vinton, New York City.

As Associate.

John French Golding, New York City.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on February 2d, 1904, from the grade of Associate Member to the grade of Member:

As Members.

Howard Carter Baird, Phœnixville, Pa.
Joseph Hooker Cunningham, Portland, Ore.
Francis Winthrop Scarborough, Richmond, Va.

The Secretary announced the election of the following candidates by the Board of Direction on February 2d, 1904:

As Juniors.

William Gomer Davies, Minidoka, Idaho.
Guillermo Gustavo Fischer, Washington, D. C.
Ralph Holt Howes, New York City.
Julian Pierre William Richmond, New York City.
Edward Lawrence Sayers, New York City.
Herbert Spencer, Brooklyn, N. Y.
William Henry Yates, New York City.

The Secretary announced the following deaths:

Thomas Pearman Shanks, elected Member May 2d, 1888; died January 7th, 1904.

William Ward Reed, elected Fellow December 20th, 1872; died January 10th, 1904.

Selwyn Mellon Taylor, elected Member October 7th, 1903; died January 25th, 1904.

Alfred Rosenzweig, elected Junior June 7th, 1882; Member January 4th, 1893; died January 13th, 1904.

Adjourned.

February 17th, 1904.—The meeting was called to order at 8.40 p. m., Past-President Alfred Noble in the chair; Chas. Warren Hunt, Secretary, and present, also, 137 members and 25 guests.

A paper by James H. Brace, Assoc. M. Am. Soc. C. E., entitled "Freezing as an Aid to Excavation in Unstable Material," was presented by the author, and illustrated with lantern slides.

A written communication on the paper from George E. Thomas, M. Am. Soc. C. E., was presented by the Secretary, and the subject was discussed further by Messrs. D. E. Moran, E. L. Abbott, T. Kennard Thomson, Werner Boecklin, H. J. Campbell, Emil Diebitsch, J. G. Tait and H. Reed.

The Secretary announced the following deaths:

George Thompson De Forest, elected Associate Member, December 4th, 1895; died July 25th, 1901.

Benjamin Burgh Smith, elected Member, November 7th, 1888; died February 7th, 1904.

The Secretary made an announcement in relation to the International Engineering Congress to be held at St. Louis during the Annual Convention of the Society.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

January 12th, 1904.—8.30 P. M.—(Adjourned from January 5th.)—President Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Briggs, Craven, Croes, Knap, Kuichling, Osgood, Pegram, Schneider and Wilgus.

The meeting was devoted to further consideration of the arguments for and against the joining of this Society in the proposed Union Engineering Building, for presentation to the Annual Meeting, and a statement was formulated and adopted.

The following resolutions were adopted for presentation to the Annual Meeting:

"The Board of Direction recommends the adoption by the Annual Meeting of the following resolutions."

"(1) *Resolved*, That the Board of Direction be instructed to issue a letter-ballot, to be canvassed at the Meeting of the Society, March 2d, 1904, on the question whether this Society shall become one of the Constituent Societies in the occupancy and control of the proposed Union Engineering Building, under the terms outlined by the Joint Conference Committee."

"(2) *Resolved*, That should a majority of the votes cast be favorable, the Board is authorized to proceed in the matter, provided the exemption from taxation of the proposed building is assured, and the interests of the Society are otherwise fully safe-guarded."

The President was authorized to appoint a General Committee to take charge of the organization and management of the International Engineering Congress.

Charles Hermany, M. Am. Soc. C. E., was selected from the membership of the Society as a member of The John Fritz Medal Board of Award.

Adjourned.

January 20th, 1904.—The Board met during the Annual Meeting as required by the Constitution, Charles Hermany in the chair; Chas. Warren Hunt, Secretary, and present also Messrs. Buck, Craven, Croes, Curtis, Davison, Deyo, Ellis, Gowen, Jackson, Knap, N. P. Lewis, Mead, Modjeski, Noble, Osgood, Pegram, and Webster.

The following Standing Committees were appointed :

Finance Committee : S. L. F. Deyo, R. S. Buck, William J. Wilgus, L. F. G. Bouscaren, Charles S. Gowen.

Publication Committee : George H. Pegram, Alfred Craven, Joseph O. Osgood, George S. Davison, Hunter McDonald.

Library Committee : Nelson P. Lewis, E. C. Lewis, Ralph Modjeski, William Jackson, Chas. Warren Hunt.

A Committee on Membership was also appointed.

Mr. Hunt then retired.

Chas. Warren Hunt was unanimously elected Secretary for the ensuing year.

Mr. Hunt, having been advised of his election, returned.

Messrs. Croes, Noble, and Craven were appointed a committee to act with the Secretary in the preparation of the letter-ballot and accompanying statements on the proposed co-operation of this Society in the Union Engineering Building.

The Secretary was instructed to issue, as soon as possible, the Report in Full of the Annual Meeting, covering the discussion on the proposed Union Engineering Building.

The Secretary presented the present status of the proposed International Engineering Congress, and a new committee was appointed consisting of all the members who had been appointed by the President of the St. Louis Exposition, together with the present Publica-cation Committee of the Society.

Adjourned.

February 4th, 1904.—8.30 P. M.—Vice-President Deyo in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Buck, Craven, Croes, Ellis, Gowen, Jackson, Knap, N. P. Lewis, Osgood, and Pegram.

Action was taken in regard to members in arrears for dues.

A letter was received from certain members of the Society residing in Brooklyn, making inquiries on certain matters connected with the proposed Union Engineering Building. A reply to this inquiry was determined upon in detail.

The resignations of Roscoe B. Jackson, Jun. Am. Soc. C. E., and E. B. Naylor, Jun. Am. Soc. C. E., were accepted.

Applications were considered and other routine business transacted.

Three Associate Members were transferred to the grade of Member, and seven candidates for Junior were elected.*

Adjourned.

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* See page 47.

REPORT IN FULL OF THE FIFTY-FIRST ANNUAL MEETING, JANUARY 20th and 21st, 1904.

Meeting Calle to Order.

Wednesday, January 20th, 1904.—The meeting was called to order at 10.15 A. M.; President Alfred Noble in the Chair; Charles Warren Hunt, Secretary, and present also about 300 members.

THE PRESIDENT.—The minutes of the meeting of January 6th, 1904, in accordance with the custom, will be printed in the January number of *Proceedings*, and come up in due course for action at the meeting of February 3d, 1904. In view of this fact, the reading of the minutes will be dispensed with, unless some call is made for them.

The reading of the minutes will be dispensed with.

Tellers appointed.

The Chair will appoint as Tellers to canvass the ballot for officers, Messrs. A. W. Trotter, H. M. Rood and B. C. Collier. The ballot does not close until twelve o'clock, noon, but in order to enable a report to be made as soon after the hour as possible, the counting will proceed. The ballots will be received up to twelve o'clock, and at that hour the ballot will be declared closed.

Report of the Board of Direction.

The report of the Board of Direction will be presented by the Secretary.

The Secretary read the report of the Board of Direction.*

On motion, duly seconded, the report of the Board of Direction was received and placed on file.

THE PRESIDENT.—The report of the Secretary.

The Secretary read his report.†

On motion, duly seconded, the report of the Secretary was received and placed on file.

THE PRESIDENT.—The report of the Treasurer, Mr. Knap.

The Treasurer read his report.‡

On motion, duly seconded, the report of the Treasurer was received and placed on file.

Nominating Committee.

THE PRESIDENT.—The appointment of the Nominating Committee. In accordance with the requirement of the Constitution, requests have been sent out to members to make nominations for the members of the Nominating Committee for each district. The Secretary will read for each district the result of those requests. It will then be in order for any member to move the election of any person nominated.

THE SECRETARY.—The nominations for the First District are as follows:

District No. 1.—Total number of votes received, 112; distributed as follows:

ALBERT CARR	28
CHAS. L. HARRISON	23
ALEX. RICE MCKIM	18

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* See *Proceedings*, Vol. XXX, p. 7 (January, 1904).

† See *Proceedings*, Vol. XXX, p. 14 (January, 1904).

‡ See *Proceedings*, Vol. XXX, p. 16 (January, 1904).

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ommittee
ntinued).

H. A. La Chicotte	4
J. Waldo Smith	4
S. W. Hoag, Jr	3
L. L. Tribus	2

The following have received one vote each:

J. A. Bensel,
L. L. Buck,
Wm. H. Burr,
Geo. H. Clark,
Francis Collingwood,
Theo. Cooper,
George B. Cornell,
E. L. Corthell,
Wm. B. Fuller,
Charles H. Graham,
Allen Hazen,
Wm. R. Hillyer,
Henry Hodge,
R. C. Hollyday,
T. J. Long,
Geo. W. McNulty,
Daniel E. Moran,
Charles H. Myers,
Edw. P. North,
John F. O'Rourke,
James Owen,
Wm. Barclay Parsons,
Henry B. Seaman,
M. R. Sherrerd,
D. McN. Stauffer,
Geo. W. Tillson,
M. A. Vielé,
Edw. Wegmann,
Samuel Whinery,
F. Stuart Williamson.

On motion, duly seconded, Albert Carr, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the First District.

The Secretary.—The nominations for the Second District are as follows:

District No. 2.—Total number of votes received, 75; distributed as follows:

Frederick Brooks	20
W. H. Moore	17
Edwin D. Graves	8
S. E. Tinkham	4
C. Frank Allen	3
H. A. Miller	3
J. R. Worcester	3
A. S. Cheever	2
X. H. Goodnough	2

The following have received one vote each:

J. P. Cotton,
Arthur W. French,
Frank W. Hodgdon,
C. M. Ingersoll, Jr.,
Wm. Jackson,*
George A. Kimball,
Henry Manley,
Leonard Metcalf,
Mace Moulton,
A. T. Safford,
Edmund K. Turner,
Leonard C. Wason,
Henry B. Wood.

On motion, duly seconded, Frederick Brooks, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Second District.

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* Ineligible.

The Secretary.—The following are the nominations for District No. 3:

District No. 3.—Total number of votes received, 25; distributed as follows:

H. A. Van Alstyne	4
Wm. A. Haven	2
John Kennedy	2
Louis H. Knapp	2
Olin H. Landreth	2
A. H. Sutermeister	2

The following have received one vote each:

E. A. Bond,
R. S. Buck,*
C. L. Crandall,
G. J. Fiebeger,
Edwin A. Fisher,
Geo. S. Greene, Jr.,*
E. B. Guthrie,
E. H. McHenry,
Chas. M. Morse,
Palmer C. Ricketts,
E. G. Spilsbury.

On motion, duly seconded, H. A. Van Alstyne, M. Am. Soc. C. E., was appointed as member of the Nominating Committee for the Third District.

The Secretary.—The nominations for the Fourth District are:

District No. 4.—Total number of votes received, 105; distributed as follows:

H. R. Leonard	43
L. Y. Schermerhorn	35
Geo E. Thackray	3
J. A. Atwood	2
C. B. Hunt	2
S. T. Wagner	2

The following have received one vote each:

Kenneth Allen,
E. M. Bigelow,
Geo. S. Davison,*
J. S. Deans,
M. T. Endicott,
L. M. Haupt,
J. F. Hayford,
D. J. Howell,
Wm. Hunter,
Thos. H. Johnson,
Morris Knowles,
Theo. A. Leisen,
D. E. McComb,
Mansfield Merriman,
Chas. M. Mills,
F. H. Newell,
Emil Swensson,
J. C. Trautwine, Jr. *

On motion, duly seconded, H. R. Leonard, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Fourth District.

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* Ineligible.

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The Secretary.—The following are the nominations for the Fifth District:

District No. 5.—Total number of votes received, 100; distributed as follows:

Joseph B. Davis	40
John W. Alvord	18
Wm. M. Hughes	10
Geo. A. Marr	3
Chas. L. Strobel	3
Geo. H. Benzenberg	2
E. E. Haskell	2
D. W. Mead	2

The following have received one vote each:

H. F. Baldwin,
Geo. H. Bremner,
Clarence Coleman,
J. T. Fanning,
Julian Griggs,
E. A. Handy,
H. E. Horton,
Robt. W. Hunt,
H. G. Kelley,
Geo. W. Kittredge,
Chas. F. Loweth,
H. W. Parkhurst,
H. E. Riggs,
J. W. Schaub,
E. C. Shankland,
G. W. Vaughn,
J. F. Wallace,*
Samuel T. Wellman,
E. S. Wheeler,
Geo. L. Wilson.

On motion, duly seconded, Joseph B. Davis, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Fifth District.

The Secretary.—The following are the nominations for the Sixth District:

District No. 6.—Total number of votes received, 71; distributed as follows:

G. B. Nicholson	22
G. G. Earl	6
S. Bent Russell	6
Chas. S. Churchill	3
J. A. L. Waddell	3
Arthur Hider	2
B. F. Thomas	2

The following have received one vote each:

T. H. Aldrich,
Ward Baldwin,
John L. Campbell,
W. W. Coe,
Wm. P. Craighill,
B. L. Crosby,
W. E. Cutshaw,
J. A. Fairleigh,
Harry Frazier,
John T. Garrett,
L. F. Goodale,
B. M. Harrod,
J. F. Hinckley,
J. W. Hoover.
A. L. Johnson,
Wynkoop Kiersted,
E. W. Van Lucas,
R. C. McCalla,
R. Montfort,
E. T. D. Myers,
John A. Ockerson,
C. D. Purdon,
J. W. Sackett,
H. M. Steele,
J. L. Van Ornum,
J. S. Walker,
Nisbet Wingfield.

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* Ineligible.

On motion, duly seconded, G. B. Nicholson, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Sixth District.

THE SECRETARY.—The nominations for the Seventh District are:

District No. 7.—Total number of votes received, 32; distributed as follows:

FRANKLIN RIFFLE	4
WM. H. KENNEDY	2
J. B. LIPPINCOTT	2
CHAS. D. MARX*	2
H. A. SUMNER	2

The following have received one vote each:

ARTHUR ADAMS,
E. B. CUSHING,
ARTHUR P. DAVIS,
GEO. L. DILLMAN,
W. A. DRAKE,
J. E. EARLEY,
C. F. W. FELT,
ROBERTO GAYOL,
C. E. GRUNSKY,
D. C. HENNY,
F. W. D. HOLBROOK,
ALEX. E. KASTL,
SCOTT KING,
S. D. MASON,
WM. G. MOLER,
A. F. ROBINSON,
JAMES D. SCHUYLER,*
J. H. WALLACE,
W. H. WENTWORTH,
E. WRIGHT.

On motion, duly seconded, Franklin Riffle, M. Am. Soc. C. E., was appointed a member of the Nominating Committee for the Seventh District.

Report of Cement Committee

THE PRESIDENT.—The report of the Committee on "Uniform Tests of Cement" will be read by the Secretary.

The Secretary read the report of the Committee on Uniform Tests of Cement, as follows:

MR. PRESIDENT, AND
MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

GENTLEMEN:—Since the presentation of the Progress Report, at the last Annual Meeting of the Society, your Committee on Uniform Tests of Cement has continued its investigations of the several matters referred to in this report.

A number of laboratory meetings were held, at which representatives from many of the prominent eastern laboratories were present and took part in the investigations which were made,

(1) In accordance with the recommendations of the Committee, and

(2) In accordance with the operators' usual practice.

The results showed a greater accordance when the operators followed the Committee's methods than when each followed his own methods, and in many cases the results obtained by an operator using the methods suggested by the Committee were higher and more nearly uniform than those obtained when he used his own.

The results of the year's work, while not conclusive, are highly gratifying.

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*Ineligible.

Report of Cement Committee (Continued).

The following changes in the Progress Report of your Committee have been considered advisable:

Par. 31. Strike out the words "500 grams" "of Cement," and insert after the word "determination," the following: "The same quantity of cement as will be subsequently used for each batch in making the briquettes (but not less than 500 grams)."

Par. 34. Strike out the paragraph and insert: "The Committee has recommended, as normal, a paste, the consistency of which is rather wet, because it believes that variations in the amount of compression to which the briquette is subjected in moulding are likely to be less with such a paste."

Par. 46. Insert at the end the clause: "Sand having passed the No. 20 sieve shall be considered standard when not more than one per cent. passes a No. 30 sieve after one minute continuous sifting of a 500-gram sample."

Par. 70. Insert at the end "or preservation in air."

Par. 72. Insert at the end "a similar pat is maintained in air at ordinary temperature and observed at intervals."

Par. 73. Strike out accelerated test "(a)." The Committee's experiments show that this test is of no practical value within any reasonable period of time.

The following investigations are still in progress:

1. The effect of magnesia (MgO) and sulphuric acid (SO_3) on the quality of the cement,
2. The effect of drying on the determination of specific gravity,
3. The value of suggested changes in the shape of the briquette and the form of the clips,
4. The value of the suggested methods for making the accelerated tests,
5. The proper rate of applying the load in tension tests,
6. The value of a more plastic paste for the neat cement tests,
7. The formula for the determination of the proper percentage of water for mortars, and
8. The substitution of a natural sand for the standard quartz.

These investigations have not been completed, because, for the most part, they extend over long periods of time.

In view of the incompleteness of this work, your Committee cannot present a final report at this time, and requests that it be continued.

Submitted on behalf of the Committee.

G. S. Webster,
Chairman.
Richard L. Humphrey,
Secretary.

Committee:
George S. Webster,
Richard L. Humphrey,
George F. Swain,
Alfred Noble,
Louis C. Sabin,
S. B. Newberry,
Clifford Richardson,
W. B. W. Howe,
F. H. Lewis.

The President.—The report of the Committee is before the meeting. What disposition shall be made of it?

It was moved and seconded that the report be received and placed on file, and that the request of the Committee that it be continued, be approved.

The motion was carried.

Award of Prizes.

THE PRESIDENT.—The Secretary will present a report from the Board of Direction as to the award of prizes.

The Secretary read the report.*

On motion, duly seconded, the report was received and placed on file.

Internationa Engineering Congress.

THE PRESIDENT.—The Secretary will present a special report as to the Engineering Congress and Society Convention.

The Secretary read the following:

Report in Regard to an International Congress of Engineering.

The Society, as announced in the Annual Report of the Board of Direction, has undertaken the organization and management of an International Engineering Congress, to be held at St. Louis, Mo., during the week beginning October 3d, 1904.

The general plan and scope of this Congress are as follows:

A number of engineering subjects have been selected, each, it is believed, of live interest at the present time. On each of these special subjects, an engineer, especially qualified for the work, will be asked to prepare a succinct review of the development of practice during the past ten years, and to give a brief summary of present practice. At least one such expert in America will be asked to write on each of these subjects, and to confine his paper to American practice. Experts in other countries will be asked to contribute similar papers, covering foreign practice.

The plan is to print, as far as possible, these papers in advance of the date for holding the Congress, so that they will be available for those desiring to discuss them.

It is not the intention to read any papers at the Congress, but to throw open each of the subjects for further discussion.

Promises of papers on twenty or more of the subjects selected have already been received from American engineers, and the project has generally been received with so much interest that it is believed a notable contribution to engineering literature will result.

The acceptance of the invitation of this Society, for a visit to this country by members of the Institution of Civil Engineers some time ago, has resulted in an arrangement by which it is expected that a large party of British Engineers will arrive in New York in the latter part of September, so that, after visiting the Society in its house, they may go to St. Louis during the Congress.

In addition to this, engineers in all other foreign countries will be ternational ngineering Congress ontinued).

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* See *Proceedings*, Vol. XXX, p. 3 (January, 1904).

invited to join the Congress, and, as the Convention of this Society will be coincident with the Congress, everything points to a very large attendance.

It was moved and seconded that the report be received and filed.

E. P. North, M. Am. Soc. C. E.—Would it not do to move at one time that all these reports be received and filed?

The President.—The Chair may venture to assume that is the desire of the meeting.

H. R. Leonard, M. Am. Soc. C. E.—I think it may be well to add to Mr. North's motion, that the report be approved and filed.

The President.—I will put Mr. North's motion. I think it would be better to confine it to this subject, that the report be received, approved and filed.

The motion, being put to vote, was carried.

The President.—The next paper may give rise to some discussion, and the Chair would request that members, in rising, for the benefit of the stenographer, announce their names.

Proposed Special mmittee on ncrete and el-Concrete.

The Secretary will present a special report from the Board of Direction in the matter of the appointment of a Special Committee on "Concrete and Steel-Concrete."

The Secretary read the report, as follows:

Report of the Board of Direction in the Matter of the Proposed Concrete and Steel-Concrete Committee.

At the Annual Convention, June 11th, 1903, the following resolution was adopted:

> "It is the sense of this meeting that a Special Committee be appointed to take up the question of concrete and steel-concrete, and that such committee co-operate with the Association for Testing Materials, and the Railway Engineers' Maintenance of Way Association, which also have a committee on this subject."

At the regular Business Meeting of the Society, September 2d, 1903, all the necessary preliminary steps were taken, and the matter was referred to the Board of Direction, under Article VI, Section 12, of the Constitution.

The Board of Direction now presents the proposition for the appointment of such Committee, recommending a letter-ballot upon it, and presents herewith arguments for and against such appointment.

Arguments in Favor.

1.—Concrete when used either alone or in combination with steel presents so many advantages over other materials that it will soon be used in the greater part of all engineering structures. This is already the case in Europe.

2.—The results of tests, up to the present time, made in the various laboratories in this country, indicate that unless all tests are made under exactly the same conditions no comparisons are possible, and therefore the results are in doubt.

3.—The use of this material should be guided by a Committee of this Society. Conclusions reached by such a Committee would carry greater weight on this subject than those of any similar Committee from any other engineering society.

4.—Similar Committees have been appointed by the Railway Engineers' Maintenance of Way Association, and the Association for Testing Materials, and the co-operation of these and similar Committees with a Committee of this Society, would add strength to its conclusions.

Arguments Against.

1.—The subject is a very comprehensive one, and, if properly carried on, represents a great deal of work.

2.—Experience has shown that in several cases Special Committees to report on engineering subjects have been appointed, and have been continued for years without having accomplished anything, or made a final and conclusive report. Unless, therefore, there is a strong demand for the appointment of a Committee to report on Concrete and Steel-Concrete, a demand which would indicate a prospect of actual accomplishments, it should not be appointed.

By order of the Board of Direction.

Chas. Warren Hunt,
Secretary.

January 19th, 1904.

A Member.—I move that that be acted on by letter-ballot.

The President.—Is the motion seconded?

J. J. R. Croes, Past-President, Am. Soc. C. E.—I second the motion. Is it in order to send a question out to letter-ballot presented in that form?

The President.—Will the Secretary read the requirements of the Constitution?

The Secretary read Section 12, Article VI, of the Constitution.

The President.—The Chair is of the opinion that the motion is in order. Are there any remarks on the motion?

This vote requires a two-thirds vote of the corporate members present. The Chair will therefore request the corporate members present, who are in favor of the issuing of this ballot, to rise.

The Secretary announced 145 voting in the affirmative.

The President declared the motion carried.

Proposed Union Engineering Building.

The President.—The Secretary will read the special report of the Board of Direction on the action of this Society on the proposed Union Engineering Building.

The Secretary read the special report.*

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* This report has been issued to all corporate members.

Proposed Union Engineering Building (Continued).

THE PRESIDENT.—Since the statement of the 16th inst. regarding the project for a Union Engineering Building was issued by the Board of Direction, a further development of great importance has occurred, which it is my duty to lay before this meeting. This action is not merely of my own determination, but is concurred in and insisted on by all the members of the Board of Direction with whom it has been possible to consult. Through the initiative of the Joint Conference Committee, composed of representatives of the five organizations named in Mr. Carnegie's original offer, an interview was had with Mr. Carnegie at his residence on the evening of the 18th inst. This was attended on the part of the organizations by one representative from each, the American Society of Civil Engineers having been represented by me. It was represented to Mr. Carnegie that preliminary plans of the proposed building, based on estimates of space required, submitted for the several organizations, showed that the amount named by him in his original letter of gift—$1 000 000—would not be adequate for the purpose intended, and approximate estimates of cost of a suitable building were submitted, whereupon he added the following words to his original offer:

"JANUARY 18, 1904.

"Your plans for all the Societies show a greater sum needed. I make it one and a half millions.

(Signed) "ANDREW CARNEGIE."

A certified copy of the original offer with the above paragraph appended is herewith submitted for the files of the Society.

Early in the conference Mr. Carnegie showed great interest and anxiety as to the probable action of this Society, expressing the idea that, in readiness to co-operate, Americans excel all other nationalities, and hence their work is more effective; the hope that this Society would decide to co-operate by a great majority, and not by a mere numerical superiority, and the strongest desire to provide a suitable home for the whole engineering profession. The idea of complete co-operation was constantly on his mind, and he frequently recurred to it as essential to the carrying out of his project. To a suggestion that the details should be proceeded with vigorously, he demurred, saying it would be necessary to ascertain first whether the American Society of Civil Engineers would accept, and by repeated reference, made it clear that he anticipated the acceptance of all the organizations, and allowed uncontradicted the inference that only the acceptance of all five organizations would make the offer effective. Among other expressions one was particularly pointed; that if this Society should decline to come into the project, he would have on his hands the five lots purchased for the Engineering Building, but he did not consider this investment a serious matter.

The conference is reported in some detail because it indicates an important difference in the status of the project from that heretofore supposed by the Board of Direction, on which its statement has been predicated. The Board has had ample reason to believe that Mr. Carnegie would provide for the other organizations even if this Society decided that its best interests required it to stand apart; and it is not doubted that such was Mr. Carnegie's idea at one time. Now, however, it is clear that his offer should be taken exactly as written to all of the organizations and not to a part, these organizations being the four National Engineering Societies and the Engineers' Club.

It is not intended to convey the idea that Mr. Carnegie, either at this conference or previously, distinctly stated that he would withdraw his offer if this Society should not join in the acceptance, but he left the fear that the non-acceptance by any one would result in a withdrawal of the offer.

THE SECRETARY.—Mr. President, I have a letter which was written by a very old member of the Society, with the intention that it should be read at this meeting at this time.

THE PRESIDENT.—The Secretary will read the letter.

The Secretary read the following letter:

FORT BEAR, WYOMING,
JANUARY 10TH, 1904.

MR. CHARLES WARREN HUNT,
Secretary, American Society of Civil Engineers,
220 West 57th St., New York City.

DEAR SIR: As the decision of the Society will probably be made at its approaching Annual Meeting on the 20th of January, as to its acceptance or not of the proposition of that great philanthropist Andrew Carnegie, I desire to briefly express my views.

As the subject is now understood, Mr. Carnegie stands ready to donate one and a half millions of dollars for the erection of a suitable building in New York City for the joint Headquarters of "The American Society of Civil Engineers," "The American Society of Mechanical Engineers," "The American Society of Mining Engineers" and the Engineers' Club (a purely social club), four distinct Corporations.

I am decidedly opposed to the acceptance of this offer by the American Society of Civil Engineers for the following considerations:

From its inception, something over fifty years ago, by a few Civil Engineers resident in and around New York City (the names of James Laurie, Charles W. Copeland, Julius W. Adams, Alfred W. Craven, James P. Kirkwood and Robert W. Gorsuch are now recalled), the Society has increased from a membership of 40 to 50 (up to the outbreak of our war between the States) to a membership of nearly three thousand at the present time. Its membership embraces, practically, all the leading Civil Engineers of this Country. Its professional papers, issued monthly, will compare favorably in point of ability with those of any similar society, and, as a Society, by its commanding influence, it is, by all odds, the leading Society of Engineers of the Western Hemisphere, as the British Institute of Engineers is of the Eastern Hemisphere.

Proposed Union Engineering Building (Continued).

Although its progress has been phenomenal, much more rapid than either the British Institute or of the leading French Society for a similar length of time (as per report of our Secretary), its progress was retarded twelve and a half years by the advent of that bloody conflict between the States, from 1860 to 1865 (which has immortalized the American Soldier). The smoke of that conflict had not more than cleared away ere the Members of our Society resident in and around New York City (the names given at the beginning of this article being conspicuous) took steps to gather together the remnant of the Society, preparatory to its resuscitation on Oct. 2d, 1867. The Society was reorganized, all the old members in either section of the country were notified, and its onward progress was commenced. Since that date its growth in membership and influence had been phenomenal. From a membership of about 50 in 1867, it has increased to nearly 3 000 at the present time, a membership that for high professional character and ability is not exceeded by any similar society of the world. In going by the number of monthly applications for membership, in a few years the number will increase to 5 000 names, if the Society so desires. Its income will increase proportionately. At present it is sufficient for the monthly publication of professional papers that are of immense benefit to non-resident members, especially to younger members, and causes them to take a personal interest and pride in the Society.

A member, who, as the writer, may have visited the dingy and badly lighted quarters of the Society at 73 William Street as late as 1875, and compares them with the modern, elegant and commodious quarters at 220 West 57th St., is apt to conclude that the Society, as yet, needs no more suitable quarters.

For reasons outlined as above, I earnestly oppose the offer of Mr. Carnegie, coupled as it is with a kind of partnership with other societies, however worthy their object or however high the character of their membership. The Mechanical Engineers and the Mining Engineers might well be domiciled in the same building. The American Society of Civil Engineers should, by all means, have a separate building. In ten or fifteen years a very large building may be needed for library room and its other wants. At present, it seems to me, we need no more commodious quarters. By the time larger quarters are needed, a way will be pointed out to obtain them. I am sure the great philanthropist, Andrew Carnegie, will appreciate the reasons for our declining of his offer (should that be the decision), and it may be he would agree to divide up the donation for each Society. Should the amount be sufficient for greatly enlarged quarters, it should be accepted. Mr. Carnegie has set such a pace, for the men of great wealth, by liberal donations to works of charity and education that, should he not respond to the last suggestion, there will be found others who would consider they honored themselves as well as the cause of science by a donation of such amount and with such conditions as would be acceptable to the Society.

I have been a Member of the Society for more than fifty years and am classed among the "Charter Members" by your report, and with Mr. Meyer and the surviving members of that class. It has been my misfortune to be engaged in life so far from Headquarters as to have attended only a few of the Annual Conventions or participated in the benefits of the Society, except thro' its publications. I have always taken a deep interest in its welfare and have been the means of getting a good many new members.

Now, in the decline of life, I feel a deeper interest than ever, and hope my views as given above will be the views of the Society. I am sure that, could the founders of the Society be consulted, they would coincide with my views.

Very truly,

William D. Pickett,
M. Am. Soc. C. E.

Discussion
Proposed
Union
Engineerin
Building.

The Secretary.—Mr. Pickett was elected a Member of the Society on July 6th, 1853. (Applause.)

The President.—In order to bring the recommendation of the Board before the Society at this stage, the Secretary will read the resolutions which they have recommended for adoption.

The resolutions were read by the Secretary as follows:

"(1) *Resolved*, That the Board of Direction be instructed to issue a letter-ballot, to be canvassed at the meeting of the Society, March 2d, 1904, on the question whether this Society shall become one of the Constituent Societies in the occupancy and control of the proposed Union Engineering Building, under the terms outlined by the Joint Conference Committee.

"(2) *Resolved*, That should a majority of the votes cast be favorable, the Board is authorized to proceed in the matter, provided the exemption from taxation of the proposed building is assured, and the interests of the Society are otherwise fully safe-guarded."

It was duly moved and seconded that the resolutions offered by the Board be adopted.

The President.—The subject is now before the meeting for discussion.

P. C. Ricketts, M. Am. Soc. C. E.—Mr. President, I move that the Board be requested to send out with this ballot a statement to the effect that the members here present—a majority of the members here present—are not in favor of accepting the proposition.

The motion was duly seconded.

Robert Cartwright, M. Am. Soc. C. E.—Mr. President, in view of the importance to the Society of this question that comes up now before us, in view of the marked influence it may have, I would move, sir, that nothing comes from any man on the floor who is not a member of the Society. I want to cut out all outside discussion or representation. We may have presented to us, as by a lawyer, specious arguments and such representations as will befog us. Now, we are here for business; we want to consider this calmly, quietly, and for the best interests of the American Society of Civil Engineers.

As a non-resident member, I may have strong feelings in the matter. I don't want, at this stage of the game, to second the motion. I want to wait a little while until we have had an opportunity to become educated on the subject. No man will go farther than I will in my respect to Andrew Carnegie. At the same time, we are a child

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born, we are walking, we have grown from nothing almost to what we are, and we still can grow without any outside assistance. (Applause.)

As one of the old veterans in this Society, I can remember when there were somewhere about 275 in its membership, and now we have somewhere about 3 000. I have grown with it, and in the future we still will grow and have our own home, and not have a half interest. We want to be the whole thing. We are the whole thing. Without any wish to speak against the other societies, I am in favor of all the engineering societies of the land. At the same time, we cannot include these other societies, in my estimation, without detriment to the American Society of Civil Engineers. (Applause.) We have a recognition in Europe and all over the world. That is our membership, and we are second to none, and I want to preserve that. I want that the American Society of Civil Engineers shall not be a kindergarten and have subscriptions to keep it up.

Now, mind, don't misunderstand me. I am not saying one word against Mr. Carnegie's donation. What he has done has been done grandly. At the same time, when his donation includes these other societies and a social club, I draw the line. I belong to the Engineers' Club, but it is not to be supposed that this Society, made up as it is of a world-wide membership, shall have to go through the portals of an Engineers' Club to get into the Society. We take in everything. Our Constitution is wide enough and broad enough to take in any man who has the requisite qualifications. It is all well enough to have these sub-societies, but how long would it be, if you got into this thing, before our little quarter interest in the executive board in that corporation would have to give way to a preponderance of the others, and we would be nothing? That is as it appears to me. Now we are all here, let every man give his true opinion of these things, without any bias. Keep it to ourselves. I make that motion, that no man be allowed to address this Society unless he is a member of the American Society of Civil Engineers.

The motion was duly seconded.

THE PRESIDENT.—The Chair hardly thinks it necessary to put that question to a vote. The feeling of the membership is unmistakable, and the Chair will undertake to see that the debate is confined to the membership of the Society. No one else is desired to speak.

The question is upon Professor Ricketts' amendment, adding an additional clause to the resolution proposed by the Board.

E. A. BOND, M. Am. Soc. C. E.—Mr. President, I would like an explanation in regard to the exemption from taxation. I do not understand that question. Do you understand what the method is of this Society being exempted from taxation in case they should decide to take the new location?

MR. CROES.—Mr. President, we want to know now what we are called upon to vote on at the present time. There seem to be two resolutions offered by the Board of Direction, and two additional resolutions. What are we called on now to vote on first?

THE PRESIDENT.—The question is upon the adoption of the amendment offered by Professor Ricketts. Will Professor Ricketts state his amendment?

J. F. O'ROURKE, M. Am. Soc. C. E.—Mr. President, I rise to a point of order. My point of order is that Mr. Ricketts' motion is out of order. How we can vote to notify the Society at large that a majority has voted against it now, I do not see. (Applause.)

THE PRESIDENT.—The Chair decides that the amendment offered by Professor Ricketts is germane.

MR. O'ROURKE.—I move an amendment to that motion, then, that the Society also sends out, in case the majority is in favor of it, that fact also.

The motion was duly seconded.

J. N. GREENE, M. Am. Soc. C. E.—I move that the vote on Professor Ricketts' amendment be the expression of the Society.

A MEMBER.—It seems to me this motion of Mr. Ricketts is ill-timed. I think it would be a great deal better, and you would have the matters facilitated and made plainer if you would withdraw that for the present, and let the vote be upon the original motion, and then, afterward, is a better time to make that motion.

MR. RICKETTS.—I will withdraw the motion.

MR. O'ROURKE.—I withdraw my amendment.

THE PRESIDENT.—The question is on the adoption of the resolutions recommended by the Board.

MR. O'ROURKE.—Mr. Chairman, sometimes arguments are made orally and sometimes they are made physically. Some of those are very unpleasant. There is an argument now in favor of a new Society house presented by the occupancy of this room by an audience sufficiently large to fill it and to have cries from the rear of "Louder." This is the Annual Meeting of the American Society of Civil Engineers held in 1904, whose commodious quarters are not sufficiently commodious to take them in. This American Society of Civil Engineers, under its Constitution, can not only receive as members the members of all the other bodies that have been addressed by Mr. Carnegie in his letter, but there are three or four more that the Constitution embraces, all of whom are eligible for membership in this Society, if we carried out the original idea of the Society, and I think that we are doing it as far as we can, and that we are going to continue doing it. We would have a place where all of them could come, and where all of them could have room, whether Mr. Carnegie or the gentlemen themselves furnish the necessary funds to provide the house or provide the land.

If this Society met properly, it would meet with all engineers who are civil engineers, whether they are compelled by circumstances to iscussion on Proposed Union Engineering Building Continued).

join the smaller subdivision of that body or not. And the question that we have before us to-day is not the question altogether of whether we are going to hold ourselves as good as we are, being representatives of the American Society of Civil Engineers, or whether we are not going to be swallowed up by one of our smaller subdivisions who really belongs to ourselves, and whose honor is our honor, because we happen to be in the same building with them. Every argument that was made against this motion to-day, as presented in the report on the subject, is as strong and decided a piece of pessimism as anybody can find. What is it? It is only a question whether we are going to get broke because somebody else will: because somebody is brighter than we are, we will be put down in Europe, so that when we go there we will say, "No, I am not a Civil Engineer, I don't belong to the Society of Civil Engineers." Now, that is your pessimism!

Now, if this Society is going to follow in the general line of American progress, it will get on the path of optimism. (Applause.)

The first Society house, in William Street, was not the Society house of a lot of pessimists. The Society house proposed in Thirty-ninth Street is not a Society house of pessimists. Mr. Andrew Carnegie, himself, is not a pessimist. We debated this question of amalgamation long ago; it was always favored, always favored and always voted down. And what are we doing now? We are still debating that same thing and favoring it, some of us, some of us to the extent of $1 500 000, and there is already a motion before the house that the notice that it has been voted down shall be sent out. I believe, Mr. Chairman, that if we have a Society house in which American civil engineers, whether they are called mechanical or civil or electrical, or whatever they are called, so long as they are engineers, that the engineering body will be strengthened. I believe we are all engineers and brothers, and I believe that this project to have the brothers live together in one house is good for all, and at any time it is decided that the quarters provided are too small, the value of that house will build one four times as large and one where they can get away from these high buildings. And the social club that is so awful, by the way, you have got to go into that social club with a jimmy, from all that I can learn.

We are going to have a lot of arguments, and we are going to have men here who want to sit down on this because they love this Society so much. I say they love this Society as a baby, and a fool, and it is no good if you cannot love this Society in connection with other engineering societies. And I say the stronger we are as we view ourselves here, the stronger and better we will appear when viewed in connection with the others that we don't think are as good. I believe in our Society. I believe there never was any other society or any other house, and even if we didn't have a house at all, we would be a great engineering society, but I do feel that we should follow in the path of progress. Engineers, whose organized effort is the secret of success, ought to organize themselves so they would have the force and momentum of numbers when they wanted to accomplish something as engineers, and not be at the beck of any man who will give $75 a month, and in their profession they will get ten times that. But we are afraid somebody will belong that could not belong to our body. They will not. And we will be all the more noble, embracing them all. (Applause.)

E. E. Olcott, M. Am. Soc. C. E.—It seems to me, Mr. President, in this argument, this very interesting paper that has been read *pro* and *con*, they lay entirely too much stress and weight on the management of the Society, as though this Society were to lose its autonomy. This Society will be just the same as it always has, and will go ahead and publish the most valuable papers on civil engineering. It is only a question of tenancy that is coming up before us. It does not seem to me as though it hurt the Society or the standing of the Society. It is only whether we shall accept a present of $1 500 000, or our proportionate part of that, and it is only whether we shall be in the front ranks of progress and co-operation. Now, scientific men in the United States stand for co-operation, and it is one of the greatest glories of our country that there is no rivalry and no niggardliness about our giving to the world the results of our investigations. And we must acknowledge, that, advance as this Society has, and increase in membership as it has, the brilliant, the stirring and the phenomenal things that have been done in engineering have not all been done by this Society, and, possibly in the last two years, the other societies have eclipsed us by astonishing the world by scientific discoveries.

I think that this Society, in the interests of the Civil Engineers, would be committing a great error to decline this offer, which I think only strengthens the Society—in no way weakens it or loses its individuality. (Applause.)

Mr. Croes.—Mr. President, I rise to a point of order. This whole discussion is not germane to the question at issue before the Society just now, which is: Shall the Board of Direction submit this to a letter-ballot? Get that out of the way, then we can have a resolution that it is the sense of this meeting that the offer should be accepted, or *vice versa*, whichever way you make it. I take the affirmative in that. To get the sense of the meeting, we want to get the affirmative sense, we don't want to get the negative sense, but we want to get first the proposition: Shall this matter be sent out by letter-ballot? And the first resolution offered by the Board of Direction is the one that wants to be acted upon without amendment at all. Shall this be sent out to letter-ballot? That is the question before us now, and after we decide that, the rest comes.

(Cries of "Question.")

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The President.—The Chair will have to decide the point of order, and requests the members to limit their remarks to the question before the meeting, that is, the adoption of a resolution to direct the Board of Direction to submit the question to letter-ballot.

A Member.—When those resolutions are sent out, if they are ordered to be sent out, either at that time or earlier, will there be sent out as a part of the information to the members to vote upon, that portion of the remarks made by the President this morning, adding the statements covered by the meeting of the 18th, as I understand it, of January or December, I have forgotten which; and further, would there be an opportunity to add to the discussion, either written or orally, that can be sent out?

The President.—That matter can be met by a motion instructing the Board of Direction to do that after the vote is taken on this resolution.

F. S. Curtis, M. Am. Soc. C. E.—I offer an amendment that it require a two-thirds vote and not a majority vote.

Mr. Croes.—That is the second resolution of the Board. We are voting on one resolution at a time.

The President.—The question is on the adoption of the two resolutions recommended by the Board, and the amendment offered by Mr. Curtis. The resolutions, so far, have been considered as coupled together. Mr. Curtis's amendment to the second resolution is that we should substitute for the word "majority" the words "two thirds." The motion will then read, "Resolved, that should two-thirds of the votes cast be favorable, the Board is authorized to proceed," etc.

A Member.—I move that the Society now take a vote upon the first resolution, afterward proceeding to a consideration of the second resolution.

The motion was duly seconded.

The President.—If there is no objection, the first resolution is now before the meeting.

H. B. Seaman, M. Am. Soc. C. E.—The adoption of the first resolution as to sending out the second resolution, would depend on what the second resolution is going to be. I think the amendment of the second resolution is in order.

Foster Crowell, M. Am. Soc. C. E.—It seems to me there is only one resolution there, divided into two paragraphs, but it is all one resolution. The sending out of the letter-ballot is made dependent upon certain conditions expressed in the second paragraph.

The President.—The first resolution provides for the sending out of a letter-ballot on the question of whether this Society shall become one of the Constituent Societies in the occupation and control of the proposed Union Engineering Building. The second instructs the Board how to proceed in case the first resolution is adopted by the membership. The Chair is of the opinion that the question is divisible, and so rules. The question before the meeting, then, is on the adoption of the first resolution.

The adoption of the first resolution, being put to vote, was carried.

The President.—The question before the meeting is now on the amendment of the second resolution, to strike out the words "a majority," and substitute the words "two-thirds," so that the resolution will read:

"Should two-thirds of the votes cast be favorable, the Board is authorized to proceed in the matter, provided the exemption from taxation of the proposed building is assured and the interests of the Society are otherwise fully safeguarded."

Theodore Cooper, M. Am. Soc. C. E.—Mr. President, why insist on sending out a statement that two-thirds or less than two-thirds vote for this matter? We are a body of intelligent men, and you are going to send the ballots out to our equals throughout the country, also intelligent. Why not, then, tell them what this meeting does? A majority is in favor, or a majority is against, the resolution. Why not say so? What is the purpose of confining the statement to our absent members that two-thirds did this and or two-thirds did that? (Applause.)

The President.—The Chair is in some doubt whether the gentleman who last spoke understands wholly the question. The question is on the adoption of one of the resolutions proposed by the Board. The question is on the amendment to that resolution.

Mr. Cooper.—That is what I am objecting to, sir.

Samuel Whinery, M. Am. Soc. C. E.—I call attention to the fact that this meeting has no right to say that, in order to pass any matter affecting the interests of this Society, it shall require a two-thirds vote. (Applause.)

John Bogart, M. Am. Soc. C. E.—Is there anything in the Constitution of our Society which enables the Annual Meeting to determine how much of a vote by the membership at large shall carry the projected proposition?

The President.—Nothing whatever in the Constitution. We are advised by counsel that this meeting, or any meeting, or the Board of Direction, or the Society as a whole, can act upon, adopt or decline to enter into this project. I think that covers the right of this meeting to prescribe a two-thirds vote if it chooses, and the Chair would so rule.

G. W. Catt, M. Am. Soc. C. E.—Aside from the right or wrong, in reference to the two-thirds vote, it seems to me that it is entirely improper that the members here present should undertake to say to those of the vast constituency who are not here present, and who are

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entitled to just as much voice in this matter as we are, that it should require a two-thirds vote to pass this measure, or any other measure. If a measure of this kind is to require a two-thirds vote, I should say that that question by itself should first be submitted to every member, that he might say whether two-thirds were required or not. (Applause.) It is proper enough that this assemblage of members should express its sentiment one way or another on this or any other proposition, but it is surely not proper that we should undertake to tie the hands and the voices of every other member who is not present, which is at least six or seven times the number that are here.

Mr. Cartwright.—Why not make it a seven-eighths vote as well as a two-thirds vote? Now, they might just as well. Of course, that is politics, you know. I can see through it. I think we can trust the Society to the majority. We three little tailors in Pool Street are undertaking to dictate to the large membership of the Society. A majority always governs, and I would suggest that the parties asking this two-thirds vote should say a seven-eighths vote. The majority governs. That is politics, Tammany and everywhere else.

Mr. Whinery.—Mr. President, Gentlemen of the Society: It is an acknowledged rule in all deliberative bodies and in all organizations, that unless otherwise designated in the organic laws of the organization, a majority of the interests prevail. Now, there are some particular measures designated in the Constitution which require a two-thirds vote. Upon all measures of this kind the Constitution is absolutely silent, and following the law that always prevails under such circumstances, this meeting, and not only this part of the membership of the Society, but if every member of the Society were here, the meeting would have no authority whatever to prescribe that a two-thirds vote should be required.

Gardner S. Williams, M. Am. Soc. C. E.—I rise to a point of order. I should say that it seems to me contradictory to parliamentary usage for a majority or less than two-thirds to prescribe a two-thirds vote.

The Secretary.—Mr. President, may I interrupt the meeting one moment to say it is 12 o'clock, and time to declare the ballot for officers closed.

The President.—I declare the ballot for officers of this Society closed.

Mr. Curtis.—Mr. President, this is something of vital importance. This is something which requires us to give up our home, give up our property, and it seems to me, in order to do that, we ought to have two-thirds in favor of it, but if it is entirely out of order, I withdraw the amendment.

The President.—The Chair understands that the amendment is withdrawn, and the question then recurs upon the adoption of the second resolution.

A Member.—Before we consider this, I would like to ask what would be the status, provided the Society voted in its favor, as given in this first resolution, that this Society become one of the Constituent Societies in the occupancy and control of the proposed Engineering Building under the terms outlined by the General Conference Committee—then if it was found that the building was not exempted from taxation, where would the Board of Direction be? It seems to me that the resolutions as worded would leave the Board of Direction under direct orders to do a thing, and yet the second resolution leaves it to their judgment as to whether they should do it or not.

The President.—It was intended that the second resolution should qualify the first, and that the Board of Direction, in case of unforeseen obstacles of the nature referred to in the second resolution, would be empowered to delay proceedings.

The Secretary.—Mr. President, may I interrupt once more, in the interest of the record, to ask each gentleman when he gets up to speak, if he will announce his name. It is very difficult to keep track of those who speak, and it may be necessary to get a report of this meeting out very quickly, and in order to accomplish that, if every gentleman will announce his name as he gets upon his feet, it will help very much.

O. Lowinson, Assoc. M. Am. Soc. C. E.—I merely want to ask one question, before this is put to vote, and that is the question of the status of the Engineers' Club with reference to the project. I would like to ask the President whether the question came up, in the meeting with Mr. Carnegie, of the segregation of the Engineers' Club from the Union Building.

The President.—It did not.

Mr. Lowinson.—So there is nothing to advise the Society as to whether Mr. Carnegie would agree to the segregation of the building.

The President.—The matter has never been discussed with Mr. Carnegie in any way to my knowledge.

C. R. Harte, Assoc. M. Am. Soc. C. E.—Mr. President, whatever is determined in this matter will be largely done by those outside of those present to-day, the vast majority being the outside members. It seems to me in this vote we ought to state, not merely that the majority voted not to call for a two-thirds vote, but make the statement as to what proportion of the Society voted for a change to the new building, and what proportion did not. I had in mind to ask, when Professor Rickett's motion came forward, that it be amended that all letters from the older members regarding this building be sent out, also, with the letter-ballot. And it seems to me that as the vast majority of the outsiders really have little to do with the house, except very occasionally, that the action taken by the men here in New York

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and by the older members, who are particularly conservative, should in a large measure govern their vote, and for that reason I move, when this vote be taken, that the action of this meeting be designated, and that some idea of what proportion of the votes cast were in favor of the proposition, be stated.

(Cries of "Question.")

The President.—The question is on the passage of the second resolution.

It being duly put to vote, was carried.

Eugene W. Stern, M. Am. Soc. C. E.—I move the following, that there be issued with the resolution, recommending the ballot. by the Board of Direction, a statement of the conditions required for membership in the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers, and also a statement of their present financial condition.

The motion was duly seconded.

Mr. Cartwright.—Why not embody also in that the conditions and requirements of the Engineers' Club? (Applause.)

A Member.—I want to ask whether any recognition has been made by the Society of Mr. Carnegie's offer.

The President.—Yes.

Mr. Seaman.—If the last speaker will include the Engineers' Club, I would like to second that motion.

Mr. Stern.—I accept that.

Mr. O'Rourke.—Mr. President, is there anything in this matter before us which includes the Engineers' Club? As I understand, Mr. Carnegie did not address the Engineers' Club in his communication, did he?

The President.—He did.

Joseph M. Knap, M. Am. Soc. C. E.—I hope that last motion will be withdrawn. It seems to me it is making light of this matter, and I do not think we should proceed on this line. I hope the gentleman will withdraw that motion. We don't want to go to work and investigate the financial condition of brother societies. No doubt they are all right, as we are. I hope that will be withdrawn, because it won't amount to anything, and only makes a trivial matter of the whole thing.

Mr. Cooper.—Why is that not of any importance? We are going to make them our partners. Don't you inquire into the standing of your partners? We are going to give the property into the hands of nine directors representing them, and we only have three. Are we going to do it without examining the standing of our partners? No. We want to know the standing of the people we are going to put this property into the hands of. When we are going into this and we have only three votes to their nine, where are we as owners? Why shouldn't we examine into it?

Mr. Williams —Mr. President, it seems to me that the propositions covered by the last motion are abundantly provided for in the resolution already passed, which says that the interests of the Society are otherwise wholly safeguarded, and I see no reason why this Society should publish broadcast to its own members, and thereby to other people, what our views may be or what the apparent condition of our sister societies is. I think the Board of Direction is abundantly able to take care of that phase of the question for us, and I see no reason why this Society should run the risk of arousing the enmity which must necessarily be aroused by the sending out of such documents. It can only be looked upon by the other Societies as a slur upon their methods of doing business, or on their less fortunate condition.

Mr. Bond.—Recently we called for examinations, under the Civil Service rules of the State of New York, for positions in the State Engineer's Department, numbering 240. I find by the newspapers that 2 400 applicants have applied to the Civil Service Commission to take those examinations. We are proposing to spend $101 000 000 in the construction of a barge canal through the State of New York. You, gentlemen, are familiar with the amount of money being spent in this great city for public works. I think it stands us in hand to weigh this matter carefully, basing our action on broad foundations as presented by Mr. O'Rourke here to-day. I think that, if these other Societies that have been mentioned are in a poor financial condition, the future will provide for the American Society of Civil Engineers, so that if they are so unfortunate as to have to drop out of this building we can take it and carry it. To-day we have a membership of something like 3 000, as I am told. In the proportion that we get applications under the Civil Service, it is only a short time before our membership will be 30 000. Now, we should look at this thing in a broad light, I think. I think that our friend at the rear of the hall ought to withdraw his motion. I think if our friends are not as prosperous as we are, that they should not be shown up to the world. We have nothing to be afraid of. I think that this matter should receive the careful attention of this meeting to-day, and I think it is well that the action of this meeting should go out to other members who are not present. But to hold up the financial condition of our less fortunate friends, it seems to me, is a great mistake. (Applause.)

Mr. Stern.—The resolution is offered in that form merely to bring out all the facts in the case, so that they should be submitted to the judgment of the members of this Society. Statements have been made in the circular issued by the Board of Direction in a manner suggesting that the financial condition of these different Societies was not good, was not sound. I therefore have moved this resolution simply to bring out the facts. The financial statements of all these Societies are public property. It simply means that they be compiled cussion on roposed Union gineering Building ontinued).

and issued with the letter-ballot. I have to take exception to the remark of one gentleman who stated that this was not a serious motion. I wish to assure the gentleman that the motion has only a serious purpose. If we are here to pass on a very important question, the members of this Society certainly should be presented with all the facts.

Mr. Knap.—I take exception to the statement that the report sent out by the Board insinuates anything against any of the other societies. We say nothing against the other societies, and do not wish to. I think, sir, that the publication or sending out of statements to our 3 000 members as to the financial standing of these other societies will be in reality making it public, and I think we should avoid that, and I do not think it is called for in any way, shape or form, and I hope that motion will be voted down. I simply say we wish to take into account and investigate the whole matter thoroughly eventually, and the Board proposes to do that under this resolution. That will not be neglected at all, but this manner of doing it I do not think is advisable.

Mr. Greene.—Mr. President, it seems to me that this matter would be quite cleared up if we could get an answer to one question here—I mean this financial matter. Is there anything in this proposition, or in this business at all, that compels a merger of the financial conditions of all these four societies when they do come together, if they ever do. If there is not anything of that kind in it, then why is it not true that every tub will stand on its own bottom, and what odds does it make to our Society whether either one of the three are so well off or not so well off or better off than we are? Now, if there is any such information, and the Chair will give it to this house, I think we will clear away this question about going into an investigation of how much money these people are worth, or what their prospects are. Is there anything of that kind in it, Mr. Chairman?

The President.—Can the Secretary answer that question?

The Secretary.—I don't think that I understand the question exactly. Mr. Greene, will you repeat your question, and I will try and answer it?

Mr. Greene.—My question is this: Is there anything in this arrangement, if this proposition is accepted, that merges and makes all these four societies merge into one as to their financial condition, or does each society stand by itself as we do now, only we occupy one building instead of a half a dozen?

The Secretary.—There is no merger at all, as I understand it, except that each of these associations is to put its money, or its promises to pay, into a general corporation. In one sense there is a merger of the financial interests of the societies, because they will each be constituent holders of the property, but as to merging the finances of either of the societies or any of them together, there is no such proposition.

Mr. Cooper.—If there should be a default of either of the other societies, are we not responsible? We are equal partners. This is a matter of business. I have the highest respect for these other societies, and would not hurt their feelings for the world, but we are looking out for ourselves. That is a pretty important point in this world.

Mr. Olcott.—Mr. Chairman, I have read over very carefully the proposition as made. My opinion is that it seems plain that all this Society does is to become responsible for paying the interest on one-fourth of the real estate investment—call that five hundred and odd thousand dollars—we become responsible to pay 4% on that amount of money. I do not see that there is any merger at all.

Mr. Greene.—If this thing is a corporation, I think the gentleman's law will not hold good. If it is a corporation, that covers all these societies; then if there is any default, the whole corporation is responsible for that debt.

Mr. Cartwright.—That is an open matter too. All who understand partnerships know that one partner is liable for all the debts of the concern. Now, we are going into this thing. Here is a hat, and we are all asked to chip in what we have got. What are we going to get for it? It is a Mormon marriage. (Laughter.) We are talking here all the time of four societies. This offer was made to five, four Scientific Societies and one social club, share and share alike. Now, if Mr. Carnegie will, in his wisdom and his generosity—nobody thinks more of him than I do—will separate that, it will be a step in advance. But I do not favor putting our money—we have got that; it is ours; we have made it—I don't favor putting that into the general hat to be drawn out by every Philippine that comes in. I have the greatest sympathy for all these sister societies, but I do not propose that we shall pay the expenses of housekeeping for them. We will pay our own, but what are we to do with our accumulation, if there is any? It is a trust and a merger. Is the American Society of Civil Engineers going to have these two hundred and fifty or three hundred thousand dollars, or are they to put it in the hat and every fellow make a grab for it?

The President.—Mr. Secretary, can you inform the meeting how the information desired can be obtained?

The Secretary.—I think, Mr. President, it would be rather a delicate matter for this Society to issue an official statement of the financial condition of another body. The only way in which we could do that properly would be to get a certificate from the governing bodies of those societies as to what their financial condition is. I doubt very much whether the Board of Direction of this Society would care to scussion on Proposed Union ngineering Building Continued).

take a statement made up by themselves from the published statements of the other societies and publish it officially, unless it was vouched for by the treasurers of the other societies. I know that the Secretary would not care to take that responsibility.

T. L. Condron, M. Am. Soc. C. E.—Mr. President, may I ask if these statements are not already published annually by the several societies, much as they are by the American Society of Civil Engineers?

The Secretary.—I think, Mr. President, that if that motion were made, that the last financial statement as published by each of the several societies be published with this, that it would make clear what is intended, from the standpoint of the Secretary.

Mr. Stern.—I make that change. I intended that.

The President.—Will Mr. Stern state the motion as he now desires it?

Mr. Stern.—That there be issued with the resolution recommending the ballot, by the Board of Direction, a statement of the conditions required for membership in the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers, and also the Engineers' Club, also the last published statement of their financial condition.

Mr. Greene.—I move that that motion be divided, and that the vote be taken on the first part of it, on the qualifications of membership in the societies, and leave the question of financial condition for a second resolution. All these proceedings are to be read by the Society shortly, and the membership at large has already read what has been said and what is already known by our Society about the financial condition of the other societies. It is hardly necessary to send that out in a special circular now for their information. I think all the members of the Society at large must know what the relative condition of the other societies is, and it is hardly necessary. If this motion is divided and a vote taken on the first part of it, as to the qualifications for membership in those societies, I think that will answer the purpose. I move that amendment to the motion.

Seconded.

The President.—There being no remarks, the question will be put to vote on the motion:

"That there be issued with the resolution recommending the ballot, by the Board of Direction, a statement of the conditions required for membership in the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers, and also the Engineers' Club."

A rising vote being taken, the Secretary announced 153 votes for the motion and 80 votes against. The Chair declared the motion carried.

The President.—The stenographer will read the other part of the motion.

Read by the stenographer as follows.

"Also the last published statement of their financial condition."

Mr. Whinery.—May I ask a question?—Is this an amendment or a part of the motion?

The President.—It is a part of the motion. The original motion was divided into two parts, of which this is the second part.

Mr. Whinery.—Mr. President, and Gentlemen of the Society, I hope this meeting will consider very seriously and deliberately what we are now proposing to do here. In the first place, there seems to be a generally mistaken idea as to what this whole measure involves. It has been stated distinctly that it does not involve their finances, but it seems necessary to go farther and inquire what it does mean. As I understand the whole purpose—and I do not wish to be understood here as speaking in favor of the measure of combination or against it, at the present time, but merely on this particular point. What is involved, as I understand it, is this: It is proposed that the societies jointly invest in a certain tract of land for the purpose of erecting a building thereon for the joint occupation of the societies. It is not proposed that the investment in that land shall be a partnership affair at all. It is to be held by a separate corporation, separate and distinct from any of the societies, or from all of them. That corporation, it is true, is to be made up of representatives from each of the societies. Now, this corporation will ask each society to purchase and be responsible for a certain amount of the bonds, its share of the bonds issued to pay for this property—just the land—for the tract of land on which the building is to be erected. This Society purchases and holds one-fourth or one-fifth, whichever it may be, of the amount of bonds issued to pay for that property, and will have those bonds as property, and should they become worthless, we lose the amount. That is all there is in that. Now, further than that, each Society is asked to go into this building, which it is proposed to erect, without any cost to the Society, and to pay its share of the operating expenses of this building—nothing more. This corporation that it is proposed to form, to hold this property and administer it, can assess certain rentals, certain expenses of the management of the building against each society. They can do nothing further than that. I see no merger in that whatever. I do not see any partnership in it; I do not see even any entrance of this Society as a society into a corporation in which it is directly a member.

I think it is important that the responsibility that this Society shall actually assume be carefully separated from the burden which it seems to be the impression here the Society is to assume. We do not assume responsibility for this vast enterprise alone. We assume responsibility for only certain things. So much for explanation.

Now, I do not see, under these circumstances, of what benefit it would be to this Society to know the exact financial status of these other societies or what their standards of membership are to be. We are not uniting with them. The membership of this Society, if this measure be adopted, will be just as independent of each of the other societies as it is to-day—absolutely. The other societies attain no rights in the management of this Society by this proposed combination. This Society attains no rights in the management of the other societies. Now, in this matter where are we interested in the financial standing of these societies or their standard of membership? Why, if it were merely a question whether we should occupy that building with a law firm, I see no objection to it whatever. I do not think the fact that this Society, together with a law firm or a medical association or a single doctor, should agree together for their mutual benefit to erect this building and use it jointly—I do not see that it would in any way disparage this Society. It is merely a question of mutual occupation for the common benefit of all, and it seems to me we are going too far, entirely farther than is necessary, for this Society to inquire into the standards of membership or the financial condition of the existing societies. (Applause.)

Elwood Mead, M. Am. Soc. C. E.—Mr. President, I wish to make an inquiry. I do not believe that a great many members knew what they were voting on in regard to sending out an inquiry regarding the standards of admission in the other societies. I certainly know that I did not understand that I was voting on that matter. I understood it was Mr. Greene's amendment we were voting on. If we were considering the original resolution, I wish to reconsider it, because I am certainly opposed, and see no reason for sending out any information as to standards of membership in the other societies. That is simply a piece of impertinence on our part. (Applause.) There might be some propriety for our sending out information as to their financial standing, and I understood I was voting to separate that question, and I move for a reconsideration of that vote.

The President.—The Chair will be glad to consider a question for reconsideration after the disposition of the present motion, which is on the second half.

Mr. Cartwright.—One moment, please. We are threshing out; we are getting information. Now, as my friend Whinery puts it, it is all very good, but suppose for one minute these other societies are delinquent, they don't pay their interest—who is going to pay the interest? We have got to, or else we are deprived of the benefit of that trust, that Shipbuilding Trust, as I consider it. We want to know where we are at, and what we have got and what we are to do with it. If we make the partnership, it is a plain question. Put it to yourselves as business men; it is a business proposition. We are going into partnership and can't do anything else, in this building. Now, who is liable for the debts, the whole of us, or every member of the firm? Now, answer that question and then I will see better, and know where I am at.

James H. Harlow, M. Am. Soc. C. E.—I think, Mr. Chairman, if the membership will read the first half of the third page, that a good many of their questions will be answered. As I read the fourth paragraph, we become possessors of perhaps one-quarter of the bonds of an institution that is bonded for about twenty-five per cent. of its valuation. If this corporation that we are talking of cannot raise the necessary funds by assessment on the various associations, then it may be there will be a default in interest; if a default in interest, then the corporation possibly may foreclose, on a foreclosure sale. If our Society, owning one-fourth of the bonds, perhaps, chose to buy them in and get a two million dollar corporation, there is nothing to prevent it, and it seems to me it is a pretty good business proposition. (Applause.) It seems to me that is the way to look at it. We are owners of one-fourth of the bonds, I mean if we go into it. Now, it seems to me it is not a shipbuilding trust at all, because a shipbuilding trust has "X" number of bonds in excess of valuation; we have got a valuation and one-fourth perhaps in the bonds, which is a pretty safe investment. It seems to me that is the way that part of it should be looked at, and it seems to me that asking for the financial condition of our sister societies is objectionable at least. It seems to me that we should let them alone as we want to be let alone, and as an investment on our part, if they default, perhaps it will be a good thing.

F. S. Odell, M. Am. Soc. C. E.—I believe there is a motion before the house to reconsider the original vote.

The President.—No, sir; the pending motion is on the adoption of the second part of the resolution offered by Mr. Stern, which the stenographer will read, so as to make it certain the meeting understands it.

The stenographer then read the second part of Mr. Stern's motion.

Mr. Odell.—I merely wish to say that my understanding of the paragraph referred to was, not that the American Society of Civil Engineers took only one-quarter of the bond issue; the meaning it conveyed to me was that it took more like one-half, and in the event of failure of any of the other institutions, we would have to bear our share.

Mr. Harlow.—If they only have one-half, we will have that much less to buy in in case of foreclosure.

Mr. Mead.—There has been a motion to reconsider the vote on the first paragraph of this resolution; that has been seconded, and I believe claims precedence over a vote on the second paragraph.

The President.—The pending motion before the meeting was at that time the passage of the second part of this resolution, and the Chair rules that that motion is before the meeting.

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It was duly moved and seconded that the motion just read by the stenographer be laid on the table, which motion, being put to vote, was carried.

Mr. Mead.—Now, Mr. Chairman, I wish to move a reconsideration of our vote on the first paragraph of that resolution.

The President.—The Chair understands that the gentleman voted in favor of the passage of the resolution?

Mr. Mead.—Yes, sir.

A Member.—Seconded.

The President.—The motion is the reconsidering——

Mr. North.—I rise to a point of order. I think the man who seconds it voted against it. I think both the mover and the seconder should have voted for it.

Mr. Mead.—The gentleman who seconded it did not vote at all.

The President.—There is no motion before the meeting.

Mr. Williams.—I rise to a point of order.

The President.—State the point of order.

Mr. Williams.—The point of order is, having laid on the table an amendment to a motion before the house, we have thereby carried with it the original motion.

The President.—The motion laid on the table was not an amendment; it was the second part of a resolution which has been divided by the meeting into two parts.

Mr. Mead.—The reason for this reconsideration——

The President.—The Chair does not understand that there is a motion before the house. In order to bring the motion for reconsideration before the meeting, it would have to be moved and seconded by gentlemen who voted in favor of it.

Mr. Mead.—It has been so seconded.

A Member.—I second the motion.

The President.—The motion before the meeting is on the reconsideration.

Mr. Mead.—The reason for moving this reconsideration is that the matter was placed before the house in such a fashion as to lead to confusion. Mr. Greene moves an amendment to a motion, the mover of that motion does not second it, and it could only come as an amendment to the original motion by being voted on by the house. I understood that we were voting on Mr. Greene's amendment. I found, after I had voted in favor of that amendment, that I had been voting on the original motion, and I could not have voted, nor could anyone else, according to parliamentary law, have voted on that original motion in the way it came before the house. Now, if I had known what I voted on, I should have voted just the opposite way. I voted believing I was voting for the separation, for the reason that I believe that part of the resolution has no place in the action of this Society. I can see no reason for this Society to concern itself in the qualification for membership in another society of equal standing with ours. We are not merging with them. There is no reason whatever why we should concern ourselves with their standard of membership or the number of members. We may concern ourselves with the financial standing.

Mr. North.—Before that question is put, I should like to say one word, or perhaps two or three, upon this subject, because it seems germane at this time to say it, and not have the thing taken by piecemeal.

Knowing nothing of law, and having much interest in this question, I went to a lawyer whom I thought had some knowledge of corporation law, and submitted to him certain questions in regard to this proposed amalgamation of the four societies. He said: "In buying this land, will you become tenants in common? If you do, why then any part can be sold out. Or, will you be joint tenants? If you are joint tenants, then on the decease or failure of any component part of the amalgamation, you succeed to their holdings and rights in the amalgamation." I told him I did not know and did not understand before that there was any difference between a joint tenant and a common tenant. Oh, yes, says he, there is a great difference. I am sorry I cannot give his learned and technical words, but if the meeting will excuse me, I will refer to the questions that came up partially, and I will read from the circular of the 18th of November, as some people do not have it, the second and third paragraphs.

"2.—The property represented by land, buildings and equipment of the Engineering Societies shall be held and administered by an executive corporate body, preferably under a special charter to be obtained from the State of New York, each of the constituent societies being entitled to name from its membership three persons to act as incorporators and thereafter as directors.

"3.—Each society annually to elect or appoint, as their By-Laws may prescribe, one of their voting members to serve on the Board of Directors of the Executive Corporation, for a term of three years; a vacancy in said Board to be filled by an appointment made by the society the retirement of whose representative causes the vacancy."

And that is one of the arguments in the circular of the 16th in favor of it. Now, if we are joint holders in this affair, on the failure of any constituent member or one of the four, we succeed to his rights; but if we are tenants in common under this act, then the portion of the constituent member failing may be sold out. We, undoubtedly, would be able to buy it, but we would have to bid in the common market for it. Now, we find that there is no provision for loss of representation in case any society becomes delinquent, and if a society becomes delinquent, and we at that time are not able to buy its share, any one—another society or a private individual—might buy its share and take as full and complete control of that building, as I understand it, as we might.

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Mr. Cartwright.—Is it not stated there that the other societies shall have the first right to purchase any of these bonds that may in any manner come on the market?

Mr. North.—Under an execution, I don't think that that would work, although I am not a lawyer and I cannot state. At the end of this conversation, my legal friend said to me, "This is a very important matter, and you should get the very best legal advice that is possible." Said I, "Will that settle it?" "Oh, no!" (Laughter.) Said I, "What will settle it?" He answered, "The Court of last resort." Now, gentlemen, we are asked by some to make what you might call a polygamous marriage, to make it under the rules of the Roman Catholic Church which does not recognize divorce even for the statutory cause. When we make this connection, it is made for life, the life of the four societies, and the only way we can get out of it is to go out of it and leave what we have, unless some law can be devised which will save us. I do not know whether or not that law can be devised, and my legal friend did not know whether or not it could, but he said we should get the very best legal advice possible, and that wouldn't settle it. I don't think it is very well to buy a pig in a poke of that kind. It might be.

There is one point here I wish to refer to—it is a little outside of this question that is now before the house, but I do not want to get up again, and I ask the kindness of the meeting to hear me for one word or two more—that is, that we should enter upon the project with a firm determination to avoid dissension and make it helpful and healthful. That is on page 8 of the circular of January 16th. Now, in the beginning of last June, at the meeting of last June, most of the people attending it were to a large extent our guests. It is perhaps impolite to use such a term as a "snap judgment," and I will not use it, but that meeting came to our Society House with a set of resolutions and a telegram for Mr. Carnegie thoroughly prepared, which they proposed rushing through, which said it was an official meeting of the four societies, as I understood at the time, and I objected to it. This left a very unpleasant impression on my mind, the desire to commit the American Society in a meeting that was not called by the Society, and, I think, was not called through the Society—at least I knew of it only incidentally, and received no written notice of it. And the case has been further complicated lately by a circumstance to which I may refer more directly: the refusal of two at least of those societies, and possibly the third, to join us in an engineering congress at St. Louis. I believe—I say this subject to advisement—but I believe that the refusal to join us in an engineering congress was such a reply as did not admit of any further negotiation. Now, we do not, as I look upon it, wish to make an arrangement for life with three other societies, two of whom, at least, are at this time more or less hostile to us, and some of whom tried to use the Society's name to accomplish their ends without due warrant for such use.

I think an engineer, and I believe everybody here present will agree with me perfectly and thoroughly, who undertakes to do a piece of work before he has carefully looked, not only at the possibilities of doing it, but at the difficulties that he will meet, is taking money unworthily and dishonestly. And before we sink, or at least venture, our entire capital and our reputation in an enterprise of this kind, I think that all the difficulties, Mr. President, should be fairly looked at and thoroughly met in the minds of the President and the Directorate of this Society.

Now, one of the important things in this arrangement, as it looks to me, is the financial and the professional standing of these three other societies we are asked to join. We have a great interest in the financial affairs, because we are not strong enough of ourselves to carry the $540 000 that that land will cost—

Mr. Williams.—Mr. President, I rise to a point of order. The question before the house is the reconsideration, as I understand it—

Mr. North.—I will accept that point of order before it is acted on. I merely asked the indulgence of the meeting to extend my remarks.

W. C. Lambert, Assoc. M. Am. Soc. C. E.—I desire to say just a word in favor of the reconsideration. When the original question was under debate, it was very clearly stated that the Engineers' Club was to be one of the affiliating societies. It seems now, on a careful reading of the matter at the bottom of page 1 and the top of page 2, although it is to be made to apply to five corporations, the final arrangement does not include the Engineers' Club, and that the joint or common tenancy that we are asked to enter into is only with those other three organizations. The question is on our common or joint tenancy with the three societies holding the property on Thirty-ninth Street. I did not understand that that question was put. I am in favor of its reconsideration.

The motion for the reconsideration being put to vote, was carried.

The President.—The question is now upon the original motion, which the stenographer will read.

"That there be issued with the resolution recommending the ballot, by the Board of Direction, a statement of the conditions required for membership in the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers, and also the Engineers' Club."

A rising vote being taken, the Secretary announced 45 votes in favor of the resolution and 116 votes in opposition.

The Chair declared the resolution lost.

Mr. Williams.—I move we adjourn, if there is no other business.

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THE PRESIDENT.—I hope the motion to adjourn will be withdrawn. There is but very little business more to be brought before the meeting. The Secretary will read the report of the Tellers.

The Secretary read the report, as follows:

Report of Tellers Appointed to Canvass the Ballot for the Election of Officers at the Annual Meeting, January 20th, 1904.

MR. PRESIDENT:—The tellers appointed to canvass the ballots for officers respectfully report as follows:

Total number of ballots received		697
Not entitled to vote	2	
Without signature	12	
	—	14
Counted and found correct		683

For President:

Charles Hermany	674
C. C. Schneider	2
G. B. Kittredge	1
J. A. L. Waddell	1
C. A. Haswell	1
R. Hering	1
W. B. Parsons	1
A. Ziesing	1
Blank	1

For Vice-Presidents:

F. S. Curtis	677
S. L. F. Deyo	676
W. B. Parsons	1
X. H. Goodnough	1
Jas. Dun	1
H. A. Carson	1
W. H. Burr	1
L. L. Buck	1
H. G. Kelley	1
H. A. Miller	1
Wm. Hood	1

For Treasurer:

Joseph M. Knap	683

For Directors:

Charles S. Gowen	679
N. P. Lewis	676
John W. Ellis	676
George S. Webster	678
Ralph Modjeski	668
Charles D. Marx	674
H. A. La Chicotte	1
R. C. Hollyday	2
Chas. Warren Hunt	1
V. C. Bogue	1

Geo. B. Francis	1
Chas. H. Haswell	1
R. A. Cairns	1
E. P. Dawley	1
G. F. Swain	1
F. P. Stearns	1
Edgar Marburg	1
J. B. Davis	2
G. E. Ellis	1
Jas. Dun	1
L. E. Cooley	1
F. W. Cappelen	1
Onward Bates	1
W. W. Curtis	1
J. D. Isaacs	1
F. A. Molitor	1
B. S. Wathen	1
R. B. Burns	1

Alfred W. Trotter,
H. M. Rood,
B. C. Collier,
Tellers.

January 20th, 1904.

The President.—I declare the following gentlemen elected:

As President, Charles Hermany;

As Vice-Presidents, F. S. Curtis and S. L. F. Deyo;

As Treasurer, Joseph M. Knap;

As Directors, Charles S. Gowen, N. P. Lewis, John W. Ellis, George S. Webster, Ralph Modjeski and Charles D. Marx.

The Secretary will make some announcements.

The Secretary then announced certain features of the programme.

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The President.—In laying down the high office with which you entrusted me a year ago, I desire to say that my sense of the honor conferred has been a constantly increasing one, and my sense of the obligation that I am under to the Society has also been increasing. I will now request Mr. Croes and Mr. Cartwright to conduct the President-elect to the chair.

Gentlemen, it is my high privilege to present to you your President, Mr. Charles Hermany. (Applause).

Charles Hermany, President, Am. Soc. C. E.—Gentlemen, Members of the American Society of Civil Engineers, Professional Brethren, as I have known you to be for lo, these many years, I thank you for the honor you have conferred upon me upon this day. In the history and the affairs of the Society, the Annual Meeting is an occurrence of interest and importance. To me it has been on this occasion an event somewhat startling. Notwithstanding the fact that it is so, I can thank you for the honor conferred. In undertaking the assumption of an office of this kind, as I have stated, it is somewhat startling. The duties devolving upon the executive are varied and important, and, while I enter upon them with some hesitation, notwithstanding that, when I remember the long intimate relations with the men into whose faces I am now looking, I feel assured that with their co-operation, guidance and assistance, there cannot any task come before this Society that we cannot manage successfully and creditably. I thank you again for the honor conferred. (Applause.)

The Secretary.—Gentlemen, I am requested by the President of the Society to say that the meeting of the Board of Direction, which is required by the Constitution at the Annual Meeting, will be held in the Secretary's office at half-past two, and the members of the Board of Direction are respectfully requested to get there as near that time as possible.

The Society then adjourned.

EXCURSIONS AND ENTERTAINMENTS AT THE FIFTY-FIRST ANNUAL MEETING.

Wednesday, January 20th, 1904.—After the business meeting, lunch for about 450 members was served at 1.30 P. M. at the Society House. At 3 P. M. a large party, under the guidance of S. L. F. Deyo, M. Am. Soc. C. E., Chief Engineer, and George E. Thomas, M. Am. Soc. C. E., Supervising Engineer of Power-House, Interborough Rapid Transit Company, visited the new power-house of that company at Fifty-ninth Street and Eleventh Avenue. The stations and various parts of the Rapid Transit Railroad were also inspected during the afternoon.

At 9 P. M. there was a Reception, with dancing, in the Society House, at which the attendance was about 300.

Thursday, January 21st, 1904.—The day was devoted to an excursion to Boonton and Little Falls, N. J., by invitation of the Engineers and Contractors of the works. The party left New York at 9.30 A. M. on a special train over the Delaware, Lackawanna and Western Railroad, furnished by the courtesy of William H. Truesdale, President, and proceeded to Boonton, where, under the guidance of J. Waldo Smith, M. Am. Soc. C. E., Consulting Engineer; and Edlow W. Harrison, M. Am. Soc. C. E., Chief Engineer, of the Jersey City Water Supply Company, the Boonton Dam and the Conduit for the water supply of Jersey City were inspected. The party afterward visited the filtration works and pumping station of the East Jersey Water Company, at Little Falls, N. J., where lunch was served. After inspecting the works the members and their guests returned to New York, arriving at 5.15 P. M.

In the evening there was an informal "Smoker" at the Society House, about 450 members and guests being in attendance.

The following list contains the names of 493 members, of various grades, who registered as being in attendance at the Annual Meeting. The list is incomplete, on account of the failure of many members to register, and it does not contain the names of any of the guests, of the Society or of individual members:

Abbot, F. W......New York City
Abbott, E. L......New York City
Adams, Arthur......Utica, N. Y.
Aiken, W. A.......Pittsburg, Pa.
Allen, W. A........Maurer, N. J.
Allen, W. F.......New York City
Allen, W. H......Brooklyn, N. Y.
Auryansen, F.....Brooklyn, N. Y.

Babb, C. C....Washington, D. C.
Bacon, John W..Danbury, Conn.
Bailey, Geo. I....New York City
Baird, H. C.....Phoenixville, Pa.
Ball, C. B.........New York City
Bamford, W. B...New York City
Bance, C. W....Jersey City, N. J.
Barbour, F. A.....Boston, Mass.

Barnes, W. T......Boston, Mass.
Barney, P. C....Brooklyn, N. Y.
Barnsley, G. T.....Oakmont, Pa.
Basinger, J. G....New York City
Beerbower, G. M..New York City
Belknap, W. E....New York City
Benton, Lewis S..New York City
Berger, Bernt.....New York City
Betts, R. T..... Brooklyn, N. Y.
Beugler, E. J......Boston, Mass.
Bissell, H.........Boston, Mass.
Blakeslee, C...New Haven, Conn.
Boecklin, W......New York City
Bogart, John.....New York City
Boller, Alfred P..New York City
Bond, Edward A...Albany, N. Y.
Bouton, G. H..Jersey City, N. J.
Bowers, George....Lowell, Mass.
Bowman, A. L....New York City
Boyd, J. C... ....New York City
Brace, J. H.......New York City
Brackenridge, J. C., Brooklyn, N. Y.
Braine, L. F.......Newark, N. J.
Bramwell, G. W. New York City
Braslow, Barnett..New York City
Briggs, Josiah A..New York City
Brodhead, Calvin E., Wilkes Barre, Pa.
Brooks, Fred......Boston, Mass.
Brown, Le Grand, Rochester, N. Y.
Brown, T. E......New York City
Brunner, John......Chicago, Ill.
Bryson, Andrew....Reading, Pa.
Buchholz, Chas. W., New York City
Buck, R. S.....Montreal, Canada
Bullock, W. D..Providence, R. I.
Burdett, F. A.....New York City
Burpee, Moses.....Houlton, Me.
Burr, W. H.......New York City
Burrowes, H. G..Brooklyn, N. Y.
Bush, Edw. W...Hartford, Conn.
Bush, H. D.......Baltimore, Md.

Carlile, T. J....Philadelphia, Pa.
Carpenter, G. A., Pawtucket, R. I.
Carr, Albert......New York City
Cartwright, R...Rochester. N. Y.
Catt, Geo. W.....New York City
Cattell, W. A.....New York City
Chambers, H. J...New York City
Chambers, Ralph H., New York City
Chase, R. D......New York City
Chibas, Edwardo J., Santiago de Cuba
Christian, G. L...New York City
Christy, G. L.....New York City
Clark, G. Hallett..New York City
Clarke, G. C......New York City
Clarke, St. John....Bogota, N. J.
Clausnitzer, John, Brooklyn, N. Y.
Codwise, E. B....Kingston, N. Y.
Coffin, T. Amory..New York City
Cogswell, W. B..Syracuse, N. Y.
Cole, H. J........New York City
Collier, B. C......New York City
Collingwood, F..Elizabeth, N. J.
Condron, T. L......Chicago, Ill.
Conrow, H........New York City
Cook, John H....Paterson, N. J.
Cooke, Chas. H...New York City
Coombs, S. E.....New York City
Corthell, A. B.....New York City
Corthell, E. L....New York City
Coverdale, W. H..New York City
Crandall, C. L......Ithaca, N. Y.
Crane, C. A.......New York City
Crane, F. E...Amsterdam, N. Y.
Crane, W. E... .Brooklyn, N. Y.
Craven, Alfred....Yonkers, N. Y.
Croes, J. J. R.....New York City
Crowell, Foster...New York City
Cuddeback, A. W., Paterson, N. J.

Dakin, A. H., Jr...New York City
Darwin, H. G.....New York City

Davies, J. V......New York City
Davis, Chas.......Allegheny, Pa.
Davison, Geo. S...Pittsburg, Pa.
Deans, Jno. S...Phœnixville, Pa.
Devin, George....Hoboken, N. J.
Deyo, S. L. F.....New York City
Diebitsch, E .....New York City
Dorrance, W. T...New York City
Dougan, J........New York City
Dougherty, R. E..New York City
Douglass, A. C., Niagara Falls, N. Y.
Drew, C. D......Brooklyn, N. Y.
Duncklee, John B.New York City
Dunham, H. F....New York City

Easby, M. W...Philadelphia, Pa.
Edwards, J. H.....Oxford, N. Y.
Edwards, W. R...Baltimore, Md.
Ehle, Boyd.....East Creek, N. Y.
Ellis, J. W.....Providence, R. I.
Endemann, H. K..New York City
Erlandsen, O......New York City
Evans, J. M......Brooklyn, N. Y.
Evans, M. E......New York City

Fairchild, J. F.Mt. Vernon, N. Y.
Falk, Myron S....New York City
Farley, Philip P..Brooklyn, N. Y.
Farrington, H.....New York City
Ferguson, G. R...New York City
Fetherston, J. T., New Brighton, N. Y.
Fiebeger, G. J..West Point, N. Y.
Field, W. P........Newark, N. J.
Fish, J. Charles L.Palo Alto, Cal.
Fisher, Francis D..New York City
Fletcher, Robert..Hanover, N. H.
Flinn, Alfred D...New York City
Ford, F. L.......Hartford, Conn.
Ford, W. H.....Philadelphia, Pa.
Fort, E. J.......Brooklyn, N. Y.
Foster, E. H......New York City
Fox, W. G...Bulls Bridge, Conn.
Francis, Geo. B...New York City
Francis, H. N....Arlington, R. I.
Fraser, Chas. E...New York City
French, A. H....Brookline, Mass.
French, A. W...Worcester, Mass.
French, J. B.....Brooklyn, N. Y.
Frost, Geo. H.....New York City
Frost, Geo. S.....New York City
Fuller, Frank L....Boston, Mass.
Fuller, G. W......New York City
Fuller, Wm. B....Paterson, N. J.
Furber, W. C...Philadelphia, Pa.
Furman, J. R.....New York City

Gahagan, W. H..Brooklyn, N. Y.
Gardiner, F. W....New York City
Gardner, M. L.....Newark, N. J.
Garrison, F. L...Crandull, Tenn.
Gartensteig, C.... New York City
Gay, Martin......New York City
Gerber, E.........Pittsburg, Pa.
Gifford, Geo. E....New York City
Gillespie, R. H....New York City
Goldsborough, J. B., Croton-on-Hudson, N. Y.
Goodell, John M..New York City
Goodnough, X. H..Boston, Mass.
Goodrich, E. P...Brooklyn, N. Y.
Gould, E. S.......Yonkers, N. Y.
Gould, W. T.....Brooklyn, N. Y.
Gowen, C. S......Ossining, N. Y.
Graham, C. H ....New York City
Granbery. J. H..Elizabeth, N. J.
Grant, T. H.....Red Bank, N. J.
Grantham. H. T.Philadelphia, Pa.
Gray, J. C........New York City
Gray, J. H........New York City
Gray, W..........New York City
Green, B. R...Washington, D. C.
Green, C. N.......New York City
Greene, Carleton..New York City
Greene, F. S......New York City
Greene, G. S., Jr..New York City
Greene, J. N. ......Boston, Mass.
Gregory, C. E.....New York City
Greiner, J. E.....Baltimore, Md.

Griffith, L........Yonkers, N. Y.
Grimm, C. R....Brooklyn, N. Y.
Griswold, H. T. Old Lyme, Conn.
Gubelman, F. J...New York City
Gudmundsson, G .Pittsburg, Pa.

Hague, Chas. A...New York City
Haight, S. S......New York City
Hall, L. W......Tuscaloosa, Ala.
Hall, Martin W...New York City
Ham, W. H.......New York City
Hamlin, W. E.....New York City
Hammer, R. H....New York City
Hankinson, A. W..New York City
Hansel, Charles..Rochester, N. Y.
Harlow, J. H.....Baltimore, Md.
Harrington, F. F..New York City
Harrington, J. L.,
West New Brighton, N. Y.
Harris, Elmo G.......Rolla, Mo.
Harrison, C. L....New York City
Harrison, E. W..Jersey City, N. J.
Harte, C. R..Jamaica Plain, Mass.
Harwi, S. J.......Bayonne, N. J.
Harwood, G. A....New York City
Haskins, W. J....New York City
Hauck, W.........New York City
Haviland, A.......New York City
Hayes, E...........Cohoes, N. Y
Hayes, S. W........Geneva, N. Y.
Hazard, E.,
Johannesburg, South Africa
Hazard, S....White Plains, N. Y.
Hazen, Allen......New York City
Hazlett, R......Wheeling, W. Va.
Henderson, J. T..Hartford, Conn.
Henry, Philip W...New York City
Herbert, H. M. Bound Brook, N. J.
Hering, Rudolph..New York City
Hermany, Chas....Louisville, Ky
Hickok, H. A......Newark, N. J.
Hildenbrand, W...New York City
Hillyer, Wm. R...New York City
Hoffman, N. B. K..New York City
Holliday, A. R....New Castle, Pa.
Hollyday, R. C...Brooklyn, N. Y.
Hone, F. de P......New York City
Hopkins, G. G., Jr..Brooklyn, N. Y.
Howe, E. W.......Boston. Mass.
Howe, H. J........New York City
Hoyt, William E..Rochester, N. Y.
Humphrey, R. L. Philadelphia, Pa.
Hunt, Chas. W....New York City
Hunt, R. W.........Chicago, Ill.
Hunter, R. E...Montreal, Canada
Hutchinson, Cary T. New York City

Ilsley, A. B........Boston, Mass.
Irwin, J. C........New York City
Ives, A. S......Philadelphia, Pa.

Jackson, William..Boston, Mass.
Jacoby, H. S........Ithaca, N. Y
Jarrett, Edwin S..New York City
Johnson, L. E......Steelton, Pa.
Johnson, L. J..Cambridge, Mass.
Johnson, W. S.....Boston, Mass.
Jordan, W. F......New York City
Just, Geo. A......New York City

Kaufman, G.....Brooklyn, N. Y.
Keays, R. H.......New York City
Keith, H. C.......New York City
Keller, O. B.......New York City
Kelley, W. D......New York City
Kenney, E. F...Philadelphia, Pa.
Khuen, Richard...Ambridge, Pa.
Kimball, George A..Boston, Mass.
King, C. C.,
West New Brighton, N. Y.
King, Wallace., Jr. New York City
Kinsley, T. P......New York City
Knap, E. D.......New York City
Knap, J. M........New York City
Knickerbacker, John..Troy, N. Y.
Knowles, M........Pittsburg, Pa.
Kolb, Henry J....New York City

Labelle, H. F..Philadelphia, Pa.
La Chicotte, H. A. New York City

Landreth, O. H. Schenectady, N. Y.
Landreth, W. B.... Albany, N. Y.
Lavis, F.......... New York City
Leavitt, C. W., Jr.. New York City
Lee, E. H........... Chicago, Ill.
Leonard, H. R.. Philadelphia, Pa.
Lesley, R. W... Philadelphia, Pa.
Lewis, F. H...... Craigsville, Va.
Lewis, N. P....... New York City
Livingston, J. I. Bound Brook, N. J.
Long, E. M....... New York City
Loomis, Horace. Mt. Vernon, N. Y.
Lowinson, Oscar... New York City
Ludwig, Alfred.... New York City
Lundie, John...... New York City

MacCracken, G. G.. New York City
Macdonald, A. A.. New York City
MacGregor, R. A.. New York City
Machen, H. B..... New York City
MacNaughton, James,
Tahawus, N. Y.
McCann, T. H.... Hoboken, N. J.
McComb, C. O.. Watertown, N. Y.
McComb, D. E.. Washington, D. C.
McDonald, H. P., Jr.,
Jersey City, N. J.
McHarg, Leslie... New York City
McKenzie, T...... Westerly, R. I.
McKenzie, T. H.. Hartford, Conn.
McLean, A....... Brooklyn, N. Y.
McMinn, T. J..... New York City
Magor, H. B...... New York City
Maignen, J. P. A. Philadelphia, Pa.
Marden, H. H., Jr.. New York City
Marple, W. M...... Scranton, Pa.
Mason, Francis.... New York City
Mason, Geo. C.... New York City
Matcham, Chas. A.. Allentown, Pa.
Matheson, J. D... Mexico, Mexico
Mayer, Joseph.... New York City
Mead, E ..... Washington, D. C.
Melick, N. A...... New York City
Merriman, M.,
South Bethlehem, Pa.

Metcalf, L......... Boston, Mass.
Meyers, C. W..... New York City
Miller, H. A....... Boston, Mass.
Miller, H. C...... New York City
Miller, R. P...... New York City
Mills, C. M..... Philadelphia, Pa.
Miner, C. A.... Wilmington, Del.
Modjeski, Ralph.... Chicago, Ill.
Moisseiff, Leon S. New York City
Moncure, W. A. Philadelphia, Pa.
Monsarrat, N. D. Columbus, Ohio
Montony, L. G... ... Troy, N. Y.
Moore, W. H.. New Haven, Conn.
Mordecai, A..... Cleveland, Ohio
Morse, C. M....... Buffalo, N. Y.
Moss, R. E....... New York City
Myers, C. H ... New York City
Myers, John H... New York City

Nichols, C. H.. New Haven, Conn.
Noble, Alfred..... New York City
Noble, F. C...... Brooklyn, N. Y.
Norris, R. V. A.. Wilkes Barre, Pa.
Nutter, C. H...... New York City
Nye, A. S., Jr..... New York City

Oakley, G. I...... New York City
O'Brien, J. H..... New York City
Odell, F. S... Port Chester, N. Y.
Olcott, E. E...... New York City
Opdyke, S. B., Jr.. New York City
O'Rourke, John F. New York City
Orr, Alex..... Gloversville, N. Y.
Osgood, J. O..... Plainfield, N. J.
Otagawa, M........ Tokyo, Japan
Oxholm, T. S.,
West New Brighton, N. Y.

Paine, Geo. H..... New York City
Parker, A. M..... New York City
Parker, A. W.... Brooklyn, N. Y.
Parker, C. J...... New York City
Parsons, H. de B.. New York City
Parsons, W. B.... New York City
Pegram, Geo. H.. New York City

Pemoff, J. J .....New York City
Perkins, P. S...Providence, R. I.
Peterson, P. A. Montreal, Canada
Pistor, G. E. J.....Newark, N. J.
Pitts, T. D .... ..New York City
Plympton, G. W..Brooklyn, N. Y.
Polk, W. A........New York City
Pollock, C. D....Brooklyn, N. Y.
Post, H. W.......New York City
Potter, Alexander. New York City
Potter, H. W......New York City
Pratt, M. D........ Steelton, Pa.
Pratt, W. A..New Brighton, N. Y.
Pratt, W. A....Philadelphia, Pa.
Pressey, H. A..Washington, D. C.
Prichard, Henry S..Pencoyd, Pa.
Prout, H. G......New York City
Purdy, Corydon T. New York City

Quinton, J. H..Los Angeles, Cal.

Ramsey, E. P....Brooklyn, N. Y.
Reynders, J. V. W., Harrisburg, Pa.
Reynolds, J. O....New York City
Rhodes, F. D .....New York City
Rice, G. S........New York City
Richards, J. T..Philadelphia, Pa.
Richardson, C....New York City
Richardson, T. F..Clinton, Mass.
Ricketts, P. C........Troy, N. Y
Ridgway, R.......New York City
Roberts, N.....Jersey City, N. J.
Robinson, A. W., Montreal, Canada
Rosencrans, E. J..New York City
Rosenthal, A..Mt. Vernon, N. Y.
Rowell, George F. Baltimore, Md.
Ryan, M. H.......New York City
Ryder, E. M. T., New Haven, Conn.

Sabin, A. H., Long Island City, N. Y.
Sanderson, J. G....Scranton, Pa.
Saunders, W. L...New York City
Scarborough, F. W., Richmond, Va.
Schaub, J. W ......Chicago, Ill.
Schmidt, M. E....New York City
Schneider, C. C...New York City
Schumann, C. J...New York City
Shepardson, J. E., Shabbona Grove, Ill.
Sherrerd, M. R....Newark, N. J.
Shirreffs, R...Washington, D. C.
Shoemaker, M. N..Newark, N. J.
Sickman, A. F... Holyoke, Mass.
Simpson, Geo.... New York City
Simpson, Geo. F..New York City
Skinner, F. W....New York City
Smith, C. W......New York City
Smith, J. Waldo..Paterson, N. J.
Smith, L. C. L....New York City
Smith, M. H......Yonkers, N. Y.
Snow, C. H.......New York City
Snow, F. H........Boston, Mass.
Snow, J. P........Boston, Mass.
Snyder, G. D.....New York City
Sonne, Otto.......Boston, Mass.
Sooysmith, Chas..New York City
Soper, George A..New York City
Spencer, W. T. New Haven, Conn.
Sperry, H. M.....New York City
Stanton, R. B.....New York City
Stauffer, D. McN..New York City
Steffens, W. F.....New York City
Stehle, F. C.......New York City
Stepath, Chas.....New York City
Stern, E. W.......New York City
Stiger, J. S..Bernardsville, N. J.
Stoddard, G. C....New York City
Strawn, T. C......New York City
Swain, G. F........Boston, Mass.
Swensson, Emil....Pittsburg, Pa.
Swinburne, G. W. New York City
Swindells, J. S..Mt. Kisco, N. Y.

Taber, Geo. A... .New York City
Taylor, C. F.......Boston, Mass.

Taylor, Lucian A..Boston, Mass,
Temple, W. H. G., Providence, R. I.
Thacher, Edwin...New York City
Thackray, G. E...Johnstown, Pa.
Theban, J. G......New York City
Thomas, G. E.....New York City
Thomas, S. R., Hokendauqua, Pa.
Thomes, E. H.....Jamaica, N, Y.
Thompson, E. D.Philadelphia, Pa.
Thompson, H. C..New York City
Thompson, S. E., Newton Highlands, N. J.
Thomson, A., Jr..Brooklyn, N. Y.
Thomson, G. H...New York City
Thomson, T. K ..New York City
Tidd, A. W.......New York City
Tighe, J. L......Holyoke, Mass.
Tilden, C. J........Ithaca, N. Y.
Tillson, Geo. W..Brooklyn, N. Y.
Tingley, R. H....New York City
Tomkins, Calvin..New York City
Tomlinson, A. T..New York City
Tompkins, E. De V., New York City
Trautwine, J. C., Jr., Philadelphia, Pa.
Treadwell, L..Portsmouth, N. H.
Tribus, Louis L...New York City
Trotter, Alfred W.New York City
Tucker, Ross F...New York City
Tucker, Wm. C...New York City
Turner, D. L.....New York City
Turner, E. K......Boston, Mass.
Tuttle, Arthur S..New York City

Ulrich, D.........New York City
Upham, R. D.....New York City

Van Buskirk, C. R.New York City
Van Horne, J. G..New York City
Van Winkle, E. B.New York City
Vier, H..........New York City
Vorce, C. B.......New York City
Vredenburgh, W., Jr., New York City

Wadsworth J. E..New York City
Wagner, J. C...Philadelphia, Pa.
Wagner, S. T...Philadelphia, Pa.
Waldron, S. P..East Berlin, Conn.
Ward, C. R......Brooklyn, N. Y.
Waterhouse, J....New York City
Watkins, F. W., White Plains, N. Y.
Watson, Merrill...New York City
Webb, W. L....Philadelphia, Pa.
Webster, G. S..Philadelphia, Pa.
Wells, C. E.......Clinton, Mass.
Weston, R. S......Boston, Mass.
Wheeler, R. N....New York City
Whinery, S.......New York City
Whipple, G. C...Brooklyn, N. Y.
Whiskeman, J. P..New York City
Whistler, J. T..Washington, D. C.
White, L.........New York City
White, T. S.....Beaver Falls, Pa.
Whitney, F. O ....Boston, Mass.
Whitson, A. U., Croton-on-Hudson, N. Y.
Whittemore, W. F., Hoboken, N. J.
Wiggin, T. H....Brooklyn, N. Y.
Wilcock, F......Brooklyn, N. Y.
Wilcox, C. L......New York City
Wild, H. J........Portland, Me.
Wilkins, G. S.....New York City
Williams, B. L., Jr., West Orange, N. J.
Williams, C. G...Brooklyn, N. Y.
Williams, G. S ....Ithaca, N. Y.
Williamson, F. S..New York City
Wilson, C. W. S..New York City
Wilson, E. B......Rahway, N. J.
Wölfel, Paul L.Philadelphia, Pa.
Worcester, J. R....Boston, Mass.
Wright, A. W......Pomona, Cal.
Wortendyke, N. D., Jersey City, N. J.
Wright, J. Bodine.New York City

Young, C. G......New York City

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, March 2d, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership and ballots on the proposed Union Engineering Building will be canvassed, and a paper, entitled "Substructure of Marsh River Bridge," by Herbert J. Wild, Jun. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, March 16th, 1904.—8.30 P. M.—At this meeting, a paper, entitled "The Location of the Knoxville, La Follette and Jellico Railroad, of the Louisville and Nashville System," by W. D. Taylor, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

A Committee of the Board of Direction is now arranging a programme, with a view to making this Convention an International Meeting of Engineers, for the presentation and discussion of timely subjects of professional interest.

As the details of the arrangements are developed, they will be announced in *Proceedings.*

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

Robert Moore, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
James L. Frazier, " " Frankfort, Ind.
William Jackson, " " Boston, Mass.
Emil Kuichling, " " New York, N. Y.
J. L. Van Ornum, " " St. Louis, Mo.
John F. Wallace, " " Chicago, Ill.
H. J. Pfeifer, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary.*

International Engineering Congress

UNDER THE AUSPICES OF

The American Society of Civil Engineers

In conjunction with the St. Louis Universal Exposition,

October 3d to 8th, 1904.

COMMITTEE IN CHARGE:

Henry S. Haines, *Chairman*,
374 Fifth Ave., New York City.
L. F. G. Bouscaren, *Vice-Chairman*,
Cincinnati, Ohio.
William Metcalf, Pittsburg, Pa.
Benjamin M. Harrod, New Orleans, La.
Elmer L. Corthell, New York City.
Robert W. Hunt, Chicago, Ill.
George W. Melville, Philadelphia, Pa.
George B. Post, New York City.
Palmer C. Ricketts, Troy, N. Y.
George S. Davison, Pittsburg, Pa.

Charles Warren Hunt, *Secretary*,
220 West 57th St., New York City
Joseph M. Knap, *Treasurer*,
220 West 57th St., New York City.
William P. Craighill, Charlestown, W. Va.
M. T. Endicott, Washington, D. C.
Joseph Ramsey, Jr., St. Louis, Mo.
L. B. Stillwell, New York City.
M. L. Holman, St. Louis, Mo.
Joseph O. Osgood, New York City.
George H. Pegram, New York City.
Alfred Craven, New York City.

Hunter McDonald, Nashville, Tenn.

Preliminary Announcement

February 1st, 1904.

UNIVERSAL EXPOSITION, ST. LOUIS,

1904.

INTERNATIONAL ENGINEERING CONGRESS.

PRELIMINARY ANNOUNCEMENT.

An International Engineering Congress, under the auspices of the American Society of Civil Engineers, will be held at the Universal Exposition, Saint Louis, Missouri, U. S. A., during the week of October 3d to 8th, 1904.

The Congress will be one of a series of International Scientific Congresses to be held at the Exposition under the general authority and with the co-operation of the Director of Congresses.

The development of Engineering Science during the past decade has been so rapid and has extended over so wide a field that the Universal Exposition at Saint Louis seems to be a fitting time at which to review the work of the past and obtain an authoritative epitome of present practice.

The object of the Congress is to secure a thorough International consideration of certain branches of Engineering work which have been selected with special reference to their present interest and importance.

In order to facilitate the work of the Congress and to insure the presentation of topics in a systematic manner, the Committee has prepared the subjoined list of the subjects which have been selected for review and discussion.

It is to be understood that the list of subjects proposed is somewhat tentative, and may be slightly modified as the details of the programme are perfected.

As a basis for discussion at the sessions of the Congress, the Committee has invited engineers specially qualified in each of the various branches covered by the foregoing list, to prepare a review of the development during the past ten years in that branch in the United States, together with a summary of present practice. Engineers in other countries, experienced in these various lines, will be specially invited to prepare similar papers presenting a review and summary of practice in their respective countries.

It is proposed to print these papers in advance, in order that a full discussion at the various sessions may be elicited without giving up any time to the reading of papers at the Congress.

All engineers in the United States and in all other countries are invited to become members of the Congress, to attend the sessions, and to take part in the discussions; or, if unable to attend, to forward written communications on any of the selected subjects. It is not expected that delegates will be formally appointed, it being intended that an opportunity to attend shall be afforded to any who may wish to become members of the Congress.

The papers, together with the discussions upon them, will be collated and published in one or more volumes by the American Society of Civil Engineers.

The membership fee in the Congress will be $5.00, which will entitle the member to participate in the Congress and to receive a copy of the published proceedings.

All members of the American Society of Civil Engineers will be members of the International Engineering Congress without payment of the membership fee, and will be entitled to receive all the publications of the Congress.

Membership may be secured by forwarding this fee, with name and address, to the Secretary of the Committee, Charles Warren Hunt, 220 West 57th St., New York City, who will issue a receipt therefor. Each member will receive all notices, programmes, etc., issued in advance of the Congress.

LIST OF SUBJECTS:

1. Harbors.
2. Natural Waterways.
3. Artificial Waterways.
4. Lighthouses and Other Aids to Navigation.
5. Traffic on Improved Waterways, as Compared with Seaboard Traffic, and the Effect of this Development on Railroad Traffic.
6. Purification of Water:
    - *a.* For Domestic Use;
    - *b.* For the Production of Steam.
7. Turbines and Water Wheels.
8. Irrigation.
9. Railroad Terminals:
    - *a.* At Ports;
    - *b.* Inland.
10. Underground Railways.
11. Locomotives and Other Rolling Stock.
12. Live Loads for Railroad Bridges.
13. The Substitution of Electricity for Steam as a Motive Power.
14. Sewage Disposal.
15. Disposal of Municipal Refuse.
16. Ventilation of Tunnels.
17. Highway Construction.
18. Concrete and Concrete-Steel Construction.
19. Deep Foundations.
20. The Manufacture of Steel.
21. Tests of Materials of Construction.
22. Passenger Elevators.
23. Pumping Machinery.
24. Dredges: Their Construction and Performance.
25. Steam Turbines.
26. Electrical Power:
    - *a.* Generating Stations;
    - *b.* Transmission.
27. Naval Architecture.
28. Marine Engineering.
29. Dry Docks.
30. Ordnance.
31. Fortifications.
32. Mining Engineering.
    (Sub-Divisions under this heading not yet determined.)
33. Engineering Education.
    (Sub-Divisions under this heading not yet determined.)

REPORT OF THE BOARD OF DIRECTION TO THE FIFTY-FIRST ANNUAL MEETING, JANUARY 20th, 1904, IN THE MATTER OF THE PROPOSED ENGINEERING BUILDING.

The attention of the members of the American Society of Civil Engineers is called to a decision of the question whether:

The Society shall continue as heretofore to occupy its own building;

Or, shall occupy, in common with three other National Engineering Societies, suitable space in a large building owned and controlled by a Corporation composed of an equal number of representatives from each of these Societies.

The manner in which this question has come to be considered by the American Society of Civil Engineers is this:

On February 14th, 1903, Mr. Andrew Carnegie wrote this letter:

> " Gentlemen of the
> American Society of Civil Engineers,
> American Society of Mechanical Engineers,
> American Institute of Mining Engineers,
> American Institute of Electrical Engineers, and the
> Engineers' Club.
>
> " It will give me great pleasure to give say one million dollars to erect a suitable Union Building for you all, as the same may be needed.
>
> " With best wishes,
> " Truly yours,
> (Signed) " ANDREW CARNEGIE."

Mr. Carnegie has since given verbal assurance that he desires to erect a building adequate in all respects to the needs of the Societies with due provision for future growth, the cost not to be limited to the sum named in his original offer.

At the time the foregoing letter was written, the Engineers' Realty Company, an association formed for the purpose of providing a home for the Engineers' Club, had purchased a plot of land having fifty feet frontage on Fortieth Street and a depth of ninety-eight feet nine inches, half way between Fifth and Sixth Avenues.

A plot of land directly in the rear of this property and fronting on Thirty-ninth Street, with a frontage of one hundred and twenty-five feet, and a depth of ninety-eight feet nine inches, has been purchased by Mr. Carnegie at a cost of $517 000. He proposes to sell this at cost and interest to the four Engineering Societies named in his letter, or such of them as will join in the purchase, after he shall have erected upon it a building (costing approximately one million dollars) to be made adequate to the needs of all the Societies for a long time to come, which building will go with the land without extra charge to the purchasers of the land.

An adequate building will be erected by Mr. Carnegie on the adjoining lots which front on Fortieth Street, and will be similarly conveyed to the Engineers' Club. It should be stated that the representatives of the several Societies, including in this case those of the Engineers' Club, unanimously favor the complete physical separation of the two buildings. Mr. Carnegie has never formally acceded to this, but there is little room to question his acquiescence.

A conference committee of the four Engineering Societies has, after six months' deliberation, formulated conditions for the tenure of the property, the essential points of which are as follows:*

The title of the property shall be vested in an EXECUTIVE CORPORATION, which is to be created by special Act of the Legislature, and is to be composed of twelve persons, three of whom are to be chosen by each of the aforesaid CONSTITUENT SOCIETIES.

The purchase money is to be obtained by the sale of bonds of the EXECUTIVE CORPORATION, bearing interest at four per cent. per annum, and redeemable on six months' notice. Each of the CONSTITUENT SOCIETIES shall have the right to purchase at par, and hold inalienably, a proportion of these bonds corresponding to its interest in the EXECUTIVE CORPORATION. It may hold a larger proportion subject to one year's call of the EXECUTIVE CORPORATION, at par.

To meet the expenses, of interest, taxes (if any), and operation and maintenance, the EXECUTIVE CORPORATION shall assess upon each of the CONSTITUENT SOCIETIES annually, a sum sufficient to meet all obligations, proportioned to the space in the building occupied by such Society, as assigned to it by the Board of Directors of the EXECUTIVE CORPORATION.

Other scientific associations may be assigned space in the building by the EXECUTIVE CORPORATION, and the income derived from the occupants of the building shall be used by the EXECUTIVE CORPORATION for defraying ordinary expenses, establishing a repair and re-building fund and the advancing of engineering arts and science.

The Board of Direction believes that this matter should now be presented to the membership for ballot, although the project is not as yet in shape for such presentation under the instructions of the Asheville Convention. It has been demonstrated, however, that a building with suitable accommodations for all the CONSTITUENT SOCIETIES can be planned on the land selected and already secured.

The Board believes that, in the interest of all the parties concerned, a decision should be reached at as early a date as possible, and it is within the power of the Annual Meeting to order a letter-ballot, on the question as to whether the American Society of Civil Engineers shall becomeone of the CONSTITUENT SOCIETIES in the occupancy and control of the proposed UNION ENGINEERING BUILDING.

To cover this contingency, the Board has prepared the following arguments for and against the project as at present formulated, for presentation to the Annual Meeting.

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*For text in full, see Progress Report of the Board on the Project, dated November 18th, 1903.

ARGUMENTS:

IN FAVOR.	AGAINST.
1. The Society now has an opportunity to become one of four equal participants in a gift of about one million dollars to be expended for a modern building adequate for the needs of all four Societies for many years to come. Such a liberal and generous gift has never been offered to the profession before, and such an opportunity to secure a suitable building for a great Engineering Center can hardly be expected to recur. By the sale of our present property, which need not be hastened, a sufficient amount can be realized to cover the interest of the Society in the land upon which the new building is to be placed, and leave a remainder for broadening the work of the Society.	1. A professional Society should not accept a gift under conditions which may in the future hamper its independence and usefulness. It is believed that a greater sense of responsibility is produced, and a greater pride engendered, if the members of any organization feel that its support depends entirely upon themselves. On the assumption that the Engineering Building will cost $1 000 000, the increase of nominal assets of this Society will be about $250 000. As against this, the Society will be deprived of exclusive control of the property it occupies, both as regards its management and the possibility of a change of investment. The ownership will be inalienable and indivisible, and, with the control of the property, will be in the hands of the EXECUTIVE CORPORATION, in which the Society will have but one vote in four. It is to be carefully considered whether the gain is sufficient to compensate for the sacrifice of independence and individuality.
2. It is desirable to secure co-operation between the different Engineering Societies and the different classes of Engineers. Engineers in different lines of work are not brought together as much as men in other professions, and the facility for meeting friends and widening acquaintance by being housed in a common building would be of especial value to them. Better opportunities for individual intercourse and facilities for more frequent exchange of ideas and experience must be of benefit to the profession. The present stage of civilization has been marked by a great development in the applications of science, and its advance has been largely the unrecognized work of the Engineering Profession. Future progress will	2. In the practical operation of large buildings, the several floors of which are occupied by different families or business firms or associations of individuals, experience does not always show a gain in social or business affiliations or intimacy between the several tenants, simply because of their proximity. There is no precedent for anticipating a beneficial result, in this respect, from the occupation of different floors of a large building by different Societies of Engineers, each desirous of preserving its individuality and increasing its membership. The prestige of the Profession of Civil Engineering cannot be enhanced by the collection in one building of a number of separate organizations with different requirements for membership.

ARGUMENTS:

IN FAVOR.	AGAINST.
perhaps be even more marked, and the profession of Engineering should take its place as one of the most important agents in the advancement of civilization and the development of the country. It is urged that this project will aid in accomplishing this end.	It cannot be regarded as unquestionable that a greater intimacy between the several Societies would be mutually beneficial by developing a deeper professional spirit. The experience of the Institution of Civil Engineers of Great Britain indicates that a certain amount of exclusiveness and conservatism engenders in the members pride in the organization and solicitude for its welfare, and begets in the public a reliance upon its character, which might be jeopardized by such an association with other organizations having different histories, aims and traditions.
Joint occupancy and contiguity of the several organizations in a commodious Engineering Building, centrally located, would tend to the unity and strength of the Engineering Profession as a whole. The present tendency is toward specialization, and hence a segregation, which is to be deplored, and which a closer association would do much to counteract.	If, as may well be feared, joint occupancy of a common building should give rise to dissensions, the result would be a loss of prestige instead of a gain.
3. Our present building, while adequate for ordinary meetings of the Society, is inadequate in some respects for the requirements of the Annual Meeting—the principal occasion when non-resident members visit the Society House. There is no proper accommodation for giving a luncheon on this occasion, unless the Business Meeting is held elsewhere; and, with the rapid increase in membership, these conditions will grow worse from year to year.	3. The present house of the Society is a four-story and basement building of fine architectural appearance, planned and built expressly for it, on a 100-foot street, adjacent to two churches, and opposite to an imposing Fine Arts Gallery. It is fully adequate to all the present needs of the Society excepting only on the occasion of the Annual Meeting. The business offices, library and reading room, will be ample for a considerably increased membership.
The new building will give much more space and better accommodations both in the business offices and the auditoriums; and ample space for a very largely increased membership in all the organizations. A large auditorium, with seating capacity for one thousand persons, and two or three smaller ones, with seating capacity for 200 to 400 each, will provide for all meetings. Suitable provision can be made for the convenient service of luncheon on any occasion.	When more space is required two or three more stories can be added, or adjacent property can be acquired, when this becomes necessary. The present property is nearly paid for, and the regular annual surplus of receipts over expenditures is steadily increasing; there can be no doubt that the Society can make these enlargements or acquisitions whenever needed.

ARGUMENTS:

IN FAVOR.

The advantages to be gained by the common use of auditoriums, reading rooms, etc., could probably be obtained at less cost of maintenance and operation, than where different establishments are maintained; and the expenses may be partially defrayed by renting office space and auditoriums to other scientific organizations without interference with the work of the CONSTITUENT SOCIETIES.

This feature may be of considerable importance until by increase of membership the space becomes necessary for the use of the CONSTITUENT SOCIETIES, and when this occurs the Societies will be so strong that the burden will be insignificant.

AGAINST.

The experience had in the management of high buildings in New York and elsewhere, is to the effect that the cost of operation, per square foot of floor space occupied, is very much greater in a ten-story building with elevators than in a four- or six- story building without elevator service.

It is the opinion of experts in the management of buildings that the expense to this Society, by becoming a participant in the management of the proposed building, would be very greatly in excess of its present expenditure for operation of its own building.

It is doubted that a building for a home for the several societies, ten stories or thereabout in height, giving adequate architectural effect for suitably impressing the general public, and creating a pride of ownership in the minds of the members of the several societies, can be built on the proposed site, on a narrow street, in the middle of a nine hundred-foot block, likely to be occupied by business buildings of greater height.

At some future date, even with the proposed liberal allowance, the space in the proposed building will become inadequate for one or more of the CONSTITUENT SOCIETIES; all will certainly grow, but the probability is that some will grow at the expense of the others. In this case the proposed Engineering Center will be broken up, as there will be no room for further expansion, and there is sure to be diversity of opinion as to which shall go and which shall stay. This emphasizes the objection to joining in a project which makes no provision for growth, or readjustment, beyond a certain limit.

ARGUMENTS:

IN FAVOR.	AGAINST.
4. The collection of the libraries of the various Societies in one building would facilitate greatly making researches, and would result in economy of time and efficiency. Each Society would retain control of its own books, stored in separate stacks. Each Society could maintain and increase its library with no less freedom than if it occupied a separate building. A common reading room would serve for all.	4. With the libraries of the CONSTITUENT SOCIETIES under the same roof, there will not be the same incentive for maintaining the completeness of each, as the feeling will be that the other libraries, readily accessible, can be relied upon to contain all books, relating to their specialties, and it might seem a waste of money and space to have in each of the four libraries a copy of the same book; yet it seems desirable to keep the library of this Society, which is a general technical collection, larger and more complete than any other similar library in America, as complete at all times as if the Society occupied independent quarters. In case of withdrawal at some future time, the library should be as complete as if there had never been any association. It is probable that donations of publications would be restricted to one copy for the building, the several libraries being considered as one, and thus the growth of our Library would be restricted.
5. The new building, centrally placed between the two great railway terminals, and near the hotel district, will be more convenient to non-resident members, particularly to those leaving on late trains.	5. The new building will be on a 60-ft. street in a district changing from a residential to a business character.
The proposed building will be about 2 000 ft. from the nearest Subway Station; 2 100 ft. from the Grand Central Station; 3 100 ft. from the new Pennsylvania Railroad Tunnel Station (now under way), that is to say, within 10 or 12 minutes' walk from either of these stations. The 6th Avenue Elevated Station is 1 270 ft., and the nearest East Side Elevated Station is 2 320 ft. distant. The Sixth Avenue surface car line is 500 ft. away, the Seventh Ave. car line is 1 400 ft. away; by which cars the ride to the Pennsylvania Railroad Station would be two minutes; the Forty-second St. Crosstown line is 1 270 ft. away, and the Broadway surface car line 1 000 ft. away.	The present building is located on a 100-ft. street in a growing locality. It is 1 000 ft. from the nearest Subway Station, which is 5 minutes' ride from the Grand Central Station, or by walking 250 ft. to the Boulevard surface cars with 8 minutes' ride to the Grand Central Station, or by walking 300 ft. to the Seventh Avenue surface cars with 8 minutes' ride to the Pennsylvania Railroad Tunnel Station. There are five surface lines within a quarter of a mile; Broadway 200 ft.; Eighth Avenue 550 ft.; Seventh Avenue 300 ft.; Sixth Avenue 1 200 ft., and 59th Street Crosstown 800 ft. Two elevated railroad stations are each 1 600 ft. distant.
	This location is suitable for the purpose, is attractive and accessible from all directions.

ARGUMENTS:

IN FAVOR.	AGAINST.
	The area of the lot on which the present house is built is nearly one-half of that proposed for all four of the Societies in 39th St. The price paid for the former in 1896 was $14.48 per square foot; the price we are asked to pay for the latter is $41.89 per square foot, plus the interest to date of occupancy.
6. Associations of Engineers should be mutually helpful. If this Society does not join in this project, the burden upon the others will be greater. We are all members of one great profession. We should join hands with our brethren who are engaged in other lines, with the sincere desire that all work together to enhance the strength and influence of the engineering profession as a great unity.	6. This Society stands for certain principles which individualize its character, among which is the fact that the term "Civil Engineers" used in its title comprehends Military, Naval, Mining, Mechanical and Electrical Engineers, Architects and Marine Architects, as specified in its Constitution, all being eligible for membership. To be housed in the same building with other societies in which different organizations would be shortly termed "Civil," "Mechanical," "Electrical," "Mining," etc., would lead to a restriction of the proper meaning of the name of this Society in the popular estimation, thus detracting from its dignity and destroying its individuality.
7. The building would be under the exclusive control of the representatives of the four National Engineering Societies; these representatives forming an EXECUTIVE CORPORATION in which each Society would have an equal voice.	7. The management of the new building will be in the hands of an EXECUTIVE CORPORATION representing all the Societies, by which Corporation space and expense will be apportioned.
Such a Corporation, made up of the best men in the CONSTITUENT SOCIETIES, could be depended upon to deal justly with all. We should enter upon the project with a firm determination to avoid dissensions and to make it successful and helpful.	Once having committed ourselves to this project, however, we would be unable to withdraw without sacrifice of property, and would be obliged to continue the affiliation with the other Societies, even though experiences, now unforeseen, should make it desirable to sever the connection.
Possible difficulties should not deter us from joining in an enterprise which, with proper management, may be made a great benefit to the profession.	The plan of occupation and control of the new building involves an entire and undesirable change in the business management of this Society.

ARGUMENTS:

IN FAVOR.

The danger that any one of the four great National Engineering Societies may become unable to pay its expenses in the new building, seems extremely remote, if we believe in the continued future development of our country, in which all branches of the profession of Engineering will have an important part; but, if the extremely improbable should occur, and any one of the Societies should fail and withdraw, it can hardly be doubted that the others could successfully maintain the building.

Nor can it be reasonably doubted that other engineering or closely allied scientific societies, would avail themselves of any opportunity to locate in the Engineering headquarters, whenever such opportunity might be offered.

AGAINST.

Instead of being independent and retaining entire control of its property, as has so far been done with successful results, the Society will be obliged to surrender control of its real estate to an organization in which it will have only one-fourth interest, the remaining three-fourths being held by other parties.

The proposed EXECUTIVE CORPORATION is to enter upon a speculative business enterprise, viz., the management of a large building, confessedly larger than is demanded by the present needs of the participants in the ownership, in a locality the character of which is now in a transition state from residential to business occupancy, with no great likelihood of future advance in values. Especially can no increase of value be anticipated for a building designed for semi-public uses, the cost of maintaining which will be very great, and will be constant whether it is fully occupied or not.

Participation in such an enterprise is foreign to the aims and objects of the American Society of Civil Engineers, and should not be entered into.

Any loss will fall largely upon the non-resident members of the Society, who constitute three-fourths of its membership, and to whom the possession of an inseparable, fractional share of a large building will be of no benefit.

If any of the CONSTITUENT SOCIETIES default in the payment of interest, the others would face the necessity of assuming an increased burden or of losing their entire investment.

This Society cannot afford to enter into an association in which it might be responsible for the financial failure of others, without adequate protection, which has not yet been assured. This seems a possible danger on account of the present difference in the financial standing of the four national organizations.

The Board of Direction recommends to the Annual Meeting the adoption of the following resolutions:

(1) *Resolved*, That the Board of Direction be instructed to issue a letter-ballot, to be canvassed at the Meeting of the Society, March 2d, 1904, on the question whether this Society shall become one of the CONSTITUENT SOCIETIES in the occupancy and control of the proposed UNION ENGINEERING BUILDING, under the terms outlined by the Joint Conference Committee.

(2) *Resolved*, That should a majority of the votes cast be favorable, the Board is authorized to proceed in the matter, provided the exemption from taxation of the proposed building is assured, and the interests of the Society are otherwise fully safe-guarded.

By order of the Board of Direction.

CHAS. WARREN HUNT,

Secretary.

NEW YORK,
JANUARY 16TH, 1904.

For action taken at the Annual Meeting, see p. 72.

ACCESSIONS TO THE LIBRARY.

From January 13th to February 9th, 1904.

DONATIONS.*

CHANGE GEAR DEVICES.

Showing the Development of the Screw-Cutting Lathe and the Methods of Obtaining Various Pitches of Threads. By Oscar E. Perrigo. Cloth, 8x6 ins., 81 pp., illus. New York. The Derry-Collard Company, 1903. $1.00.

Some time ago the author had occasion to make an examination of the subject of change gears for engine lathes and the development of the devices for this purpose, as represented by the existing patents which have been granted for the same. The result of this study is now published so that it may serve as a book of reference. Most of the matter has been published in the columns of *Machinery.* There were one hundred and sixty-four patents examined, and out of this mass, twenty-nine were selected as bearing directly upon the change gear problem, the others being for forms of variable speed devices and similar inventions, not properly coming under the head of the evolution of the change gear. These twenty-nine patents have been described, their special or distinguishing features illustrated and compared in a manner which, it is hoped, will be useful to those who may be interested in this field of mechanical development. There is an index of three pages.

FREE-HAND LETTERING.

Being a Treatise on Plain Lettering from the Practical Standpoint for Use in Engineering Schools and Colleges. By Victor T. Wilson. Cloth, 9x6 ins., 10+95 pp., 23 plates. New York, John Wiley & Sons, 1903. $1.00.

The author's object is to cultivate the conception that all lettering is design, that any mathematical or mechanical attempt at treatment is entirely impracticable in ordinary work. Emphasis is laid upon attaining facility in the free single-stroke letter used on working drawings, by a careful analysis of the stroking and by practical points about the handling of a pen and a description and an illustration of a variety of styles from which to choose. The chapter upon the design of letters, which it is hoped, will afford matter of interest to the student, is not intended to form part of a regular course of study, but is for occasional reference only. Footnotes have been added to a number of the plates, summarizing the chief points to be noted about them, also references are printed under each plate, covering all the places in which each is discussed in the text. The Contents are: The Construction of Roman and Gothic Letters; Spacing; The Use of the Pen and Off-hand Lettering; Design of Lines and of Titles; Lettering for Various Technical Purposes, Including Photo-reproduction ; The Design of Lettering ; Mechanical Aids to Lettering.

MACHINE DESIGN.

Part I. Fastenings. By William Ledyard Cathcart. Cloth, 9x6 ins., 11+291 pp., illus. New York, D. Van Nostrand Company, 1903. $3.00.

The preface states that the main purpose of this book is to present, in compact form for the use of the student and designer, modern American data from the best practice in the branch of Machine Design, to which the work refers. The theoretical treatment of the subject has also been given; but this has been done for completeness only, since that field, the author believes, has been covered by able writers. The chapter headings are: Shrinkage and Pressure Joints; Screw Fastenings; Riveted Joints: Theory and Formulæ; Riveted Joints: Tests and Data from Practice; Keyed Joints; Pin Joints. There is an index of five pages.

AN ELEMENTARY COURSE IN THE INTEGRAL CALCULUS.

By Daniel Alexander Murray. Cloth, 8 x 6 ins., 14+288 pp., New York, Cincinnati, Chicago, American Book Company. $2.00.

The Contents are: Integration, a Process of Summation; Integration, the Inverse of Differentiation; Fundamental Rules and Methods of Integration; Geometrical Applications of the Calculus: Rational Fractions; Irrational Functions; Integrations of Trigonometric and Exponential Functions; Successive Integration; Multiple Integrals; Further Geometrical Applications; Mean Values; Applications to Mechanics; Approximate Integration; Integration by Means of Series; Integration by Means of the Measurement of Areas; Integral Curves; Ordinary Differential Equations; Appendix. There is an index of five pages.

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* Unless otherwise specified books in this list have been donated to the Library by the publishers.

DIFFERENTIAL AND INTEGRAL CALCULUS.

By Virgil Snyder and John Irwin Hutchinson. Cloth, 8 x 6 ins., 16+320 pp. New York, Cincinnati, Chicago, American Book Company. $2.00.

The Contents are: Fundamental Principles; Differentiation of the Elementary Forms; Successive Differentiation; Expansion of Functions; Intermediate Forms; Mode of Variation of Functions of One Variable; Rates and Differentials; Differentiation of Functions of Two Variables; Change of the Variable; Tangents and Normals; Polar Coördinates; Derivative of an Arc, Area, Volume and Surface of Revolution; Asymptotes; Determination of Asymptotes; Direction of Bending; Points of Inflexion; Contact and Curvature; Evolutes and Involutes; Singular Points; Envelopes; General Principles of Integration; Reduction Formulas; Integration of Rational Fractions; Integrations by Rationalization; Integration of Trigonometric and other Transcendental Functions; Integration as a Summation; Geometrical Applications; Successive Integration. There is an index of two pages.

ELEMENTS OF THE DIFFERENTIAL CALCULUS.

By James McMahon and Virgil Snyder. Cloth, 8 x 6 ins., 14+337 pp. New York, Cincinnati, Chicago, American Book Company. $2.00.

The Contents are: Fundamental Principles; Differentiation of the Elementary Forms; Successive Differentiation; Expansion of Functions; Intermediate Forms; Mode of Variation of Functions of One Variable; Rates and Differentials; Determination of Functions of More than One Variable; Successive Partial Differentiation; Maxima and Minima of Functions of Two Variables; Change of the Variable; Tangents and Normals; Derivative of an Arc, Area, Volume and Surface of Revolution; Asymptotes; Direction of Bending; Points of Inflexion; Contact and Curvature; Evolutes and Involutes; Singular Points; Curve Tracing; Envelopes. There is an index of two pages.

Gifts have also been received from the following:

Allen, Kenneth. 1 pam.
Am. Soc. Mech. Engrs. 1 bound vol.
Arango, R. M. 1 pam.
Ariz.—Agri. Exper. Station. 1 pam.
Boecklin, Werner, 1 pam.
Bond, E. A. 2 bound vol.
Boston, Mass.—Pub. Lib. 1 vol.
British Fire Prevention Comm. 42 pam.
Buffalo, N. Y.—Bureau of Water. 1 pam.
Cambridge, Mass.—Water Board. 1 pam.
Carnegie Inst. 1 pam.
Colo.—Agri. Exper. Station. 2 pam.
Conn.—R. R. Commrs. 1 bound vol.
Fisher, Edwin A. 1 pam.
Fisk, W. L. 3 maps.
Fletcher, Robert. 1 vol.
Gaudard, J. 2 pam.
Geographical Soc. of Philadelphia. 1 pam.
Great Britain—Patent Office. 6 pam.
Harrod, B. M. 6 pam.
Heyland, Alexander. 1 pam.
Humphreys, David C. 1 bound vol.
Inst. of Civ. Engrs. 2 pam.
Ludlow, Henry H. 1 pam.
McGill, Grafton L. 1 pam.
Md.—Geol. Surv. 1 pam.
Mass.—Harbor and Land Commrs. 1 bound vol.
Mass.—State Board of Health. 1 bound vol.
Metropolitan Ry. Co. 1 pam.
New South Wales—Ry. Commrs. 1 pam.
Nichols, Charles H. 1 bound vol.
Nicholson, G. B. 1 pam.
North, Edward P. 1 bound vol.
Philadelphia, Pa.—Mayor. 3 bound vol.
Philadelphia Commercial Museum. 17 pam.
Queensland—Harbours & Rivers Dept. 20 pam.
Royal Soc. of New South Wales. 1 bound vol.
San Francisco, Cal.—Board of Supervisors. 1 bound vol.
Soper, George A. 1 pam.
South Eastern Ry. Co. 2 pam.
Spearin & Preston. 1 bound vol.
Stone, Herbert E. 1 bound vol.
Tanner, J. H. 1 bound vol.
U. S. Bureau of Labor. 1 pam.
U. S. Bureau of Navigation. 1 vol.
U. S. Bureau of Yards and Docks. 1 pam.
U. S. Commr. of Education. 1 bound vol.
U. S. Corps of Engrs. 1 vol.
U. S. Director of the Census. 1 bound vol.
U. S. Naval Observatory. 1 pam.
U. S. Weather Bureau. 2 bound vol.
Univ. of Pa. 1 pam.
Value, B. R. 1 pam.
Waddell, Montgomery. 1 pam., 2 vol.
Worcester Polytechnic Inst. 1 pam.

BY PURCHASE.

The Dynamo: Its Theory, Design, and Manufacture. By C. C. Hawkins and F. Wallis. Third Edition, Revised and Enlarged. New York, The Macmillan Co., 1903.

Electric Traction. A Practical Handbook on the Application of Electricity as a Locomotive Power. By John Hall Rider. London, Whittaker & Co., New York, 1903.

Handbook of Electrical Laboratory and Testing Room. By J. A. Fleming. Vol. II. New York, D. Van Nostrand Company; London, "The Electrician" Printing and Publishing Company.

History of American Steam Navigation. By John H. Morrison. New York, W. F. Sametz & Co., Inc., 1903.

The Steam Turbine. By Robert M. Neilson. Second Edition, Revised and Enlarged. Longmans, Green, & Co., London, New York and Bombay, 1903.

Liquid Fuel and Its Combustion. By Wm. H. Booth. New York, E. P. Duton & Co., 1904.

Machine Design. Part II. Form, Strength, and Proportions of Parts. By Forrest R. Jones. Third Edition, Revised. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1904.

Technical Mechanics. By Edward R. Maurer. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1903.

A Treatise on Friction and Lost Work in Machinery and Mill-work. By Robert H. Thurston. Seventh Edition. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1904.

Die Entwickelung des Niederrheinisch-Westfälischen Stein-kohlen-Bergbaues in der zweiten Hälfte des 19. Jahrhunderts. Herausgegeben vom Verein für die bergbaulichen Interessen im Oberbergamtsbezirk Dortmund in Gemeinschaft mit der Westfälischen Berggewerkschaftskasse und dem Rheinisch-Westfälischen Kohlensyndikat. Vol. 2–6. Berlin, Julius Springer, 1902–03.

Ore Dressing. By Robert H. Richards. 2 vol. New York and London, The Engineering and Mining Journal, 1903.

Infection and Immunity, with Special Reference to the Preven-tion of Infectious Diseases. By George M. Sternberg. G. P. Putnam's Sons, New York and London, 1903.

Industrial Uses of Water. By H. De La Coux. Translated from the French and Revised by Arthur Morris. London, Scott, Greenwood & Co.; New York, D. Van Nostrand Co., 1903.

SUMMARY OF ACCESSIONS.

January 13th to February 9th, 1904.

Donations (including 18 duplicates)	158
By purchase	18
Total	176

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Baird, Howard Carter. Prin. Asst. Engr., Phœnix Iron Co., Phœnixville, Pa.	Jun. Assoc. M. M.	June 6, 1893 Oct. 5, 1898 Feb. 2, 1904
Hewes, Virgil Henry. Care, Lewinson & Just, 128 West 42d St., New York City		Feb. 3, 1904
Hubbell, Clarence William, Civ. Engr. to Board of Water Commrs., 232 Jefferson Ave., Detroit, Mich.	Jun. Assoc. M. M.	May 31, 1898 April 4, 1900 Jan. 5, 1904
Lyon, Henry Lloyd. Deputy Water Commr., Municipal Bldg., Buffalo, N. Y.		Feb. 3, 1904
Miller, Rudolph Philip. 141 East 40th St., New York City	Jun. Assoc. M. M.	Jan. 2, 1890 April 7, 1897 Jan. 5, 1904
Ross, Florian Gaie. Farmers Bank Bldg., Pittsburg, Pa.		Dec. 2, 1903
Sleeper, George Edward. P. O. Box 3198, Boston, Mass.		Feb. 3, 1904
Souder, Harrison. 4435 Sansom St., Philadelphia, Pa		Jan. 6, 1904
Thomson, Reginald Heber. City Engr., 701 Yesler Way, Seattle, Wash.		Dec. 2, 1903
Zinn, George Arthur. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Wheeling, W. Va.		Feb. 3, 1904

ASSOCIATE MEMBERS.

Adgate, Frederick Whitney. Supt. for Foundation & Contr. Co,, Omaha, Nebr.		Jan. 6, 1904
Boardman, Harold Sherburne. Assoc. Prof. of Civ. Eng., Univ. of Maine, Orono, Me		Feb. 3, 1904
Burrowes, Harry Gilbert. Res. Engr., Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y.	Jun. Assoc. M.	Sept. 2, 1902 Feb. 3, 1904
Clark, Edward Cotman. (Swinburne & Clark), 156 Fifth Ave., New York City		Feb. 3, 1904
Cummings, Noah. Asst. Engr., Dept. of Bridges, 213 West 136th St., New York City	Jun. Assoc. M.	Mar. 3, 1896 Jan. 6, 1904
Downes, Alfred Kimball. 71 Broadway, New York City		Feb. 3, 1904
Fuller, Andrew Daniel. Cons. and Contr. Engr., 3 Hamilton Pl., Boston, Mass.	Jun. Assoc. M.	Dec. 6, 1898 Jan. 6, 1904
Fuller, Carl Hamilton. L. Schreiber & Sons Co. (Res., 3606 Bevis Ave., Station H), Cincinnati, Ohio	Jun. Assoc. M.	Mar. 5, 1901 Feb. 3, 1904
Kelly, William. 1st Lieut., Corps of Engrs., U. S. A., U. S. Engr. Office, New London, Conn.		Feb. 3, 1904
Merrill, Ogden. 78 South 10th St., Brooklyn, N. Y.		Feb. 3, 1904
Rainbow, John Roworth. 42 West 26th St., New York City.		Jan. 6, 1904

	Date of Membership.
Roundey, Eugene Peronneau. Asst. Hydrographer, U. S. Geological Survey, 39 West St., Utica, N. Y.	Jan. 6, 1904
Smith, Edgar Maverick. Engr., Ry. Appliances Co., 1175 Old Colony Bldg., Chicago, Ill.	Dec. 2, 1903
Thomson, Alexander, Jr. Asst. Engr., Rapid Transit Comm., 4 Court Sq. (Res. 351a Quincy St.), Brooklyn, N. Y.	Jun. Dec. 4, 1900 Assoc. M. Feb. 3, 1904
Vinton, Thomas MacIntire. Secy. and Treas., Tucker & Vinton, 156 Fifth Ave., New York City	Feb. 3, 1904

ASSOCIATES.

Golding, John French. Pres., Expanded Metal Eng. Co., 256 Broadway, New York City	Feb. 3, 1904

JUNIORS.

Anthony, Walter Loring. Care, R. H. Tingley Co., 75 Westminster St., Providence, R. I.	Jan. 5, 1904
Fischer, Guillermo Gustavo. 1534 I St., N. W., Washington, D. C	Feb. 2, 1904
Howes, Ralph Holt. 36 East 28th St., New York City	Feb. 2, 1904
Leake, Boudinot Gage. Gen. Office, C., R. I. & G. Ry., Fort Worth, Tex	Jan. 5, 1904
Plogsted, Walter John. Yale, Okla.	Oct. 6, 1903
Sayers, Edward Lawrence. Care, P., N. Y. & L. I. R. R., 20 West 34th St., New York City	Feb. 2, 1904
Tunstall, Whitmell Pugh. Care, Div. Engr., M. of W., B. & O. R. R., Cleveland, Ohio	Oct. 6, 1903
Walters, Henry Radclyffe St. Arvans. Engr. and Chf. Draftsman, The Guerber Eng. Co. (211 S. New St.), Bethlehem, Pa	Oct. 6, 1903

RESIGNATIONS.

	Date of Resignation.
Jackson, Roscoe Bradbury	Dec. 31, 1903
Naylor, Ezra Booth	Dec. 31, 1903

DEATHS.

DeForest, George Thompson	Elected Associate Member, December 4th, 1895; died July 25, 1901.
Rosenzweig, Alfred	Elected Junior, June 7th, 1882; Member, January 4th, 1893; died January 13th, 1904.
Smith, Benjamin Burgh	Elected Member, November 7th, 1888; died February 7th, 1904.
Taylor, Selwyn Mellon	Elected Member, October 7th, 1903; died January 25th, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(January 13th to February 8th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*. Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E., London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.
(69) *Mill Owners*, New York City, 10c.
(70) *Engineering Review*, New York City, 10c.
(71) *Journal*, Iron and Steel Inst., London, England.
(73) *Electrician*, London, England, 18c.
(74) *Transactions*, Inst. of Min. and Metal., London, England.

LIST OF ARTICLES.

Bridge.

Deflections of Beams with Variable Moments of Inertia. C. W. Hudson, M. Am. Soc. C. E. (54) Vol. 51.
Loadings for Railroad Bridges. An Informal Discussion. (54) Vol. 51.
The Assimilation of Railway Practice in Respect of Loads on Bridges up to 200 Feet Span. Alexander Ross, M. Inst. C. E. (63) Sup., Vol. 154.
An Unusual Bridge Accident.* (13) Jan. 14.
Reinforced Concrete Arch Bridge over the Yellowstone River, Yellowstone National Park.* H. M. Chittenden. (13) Jan. 14.
Details of the Williamsburg Bridge Towers.* (14) Jan. 16.
A French Cantilever Bridge without a Suspended Span. (14) Jan. 16.
Proposed Reconstruction of the Brooklyn Bridge.* (Report by Gustav Lindenthal.) (19) Jan. 16.
The Point Bridge at Pittsburg, Pa., Which Must Be Rebuilt.* (13) Jan. 21.
Concrete Arch Bridge with Spandril Relieving Arches.* (12) Jan. 22.
The Manhattan Bridge across the East River.* (46) Jan. 23.
The New Stone Arch Bridge of 295 Ft. Span at Plauen, Saxony.* (13) Jan. 28.
The Des Moines River Viaduct of the Chicago Great Western Railway.* (14) Serial beginning Jan. 30.
Types of Concrete Steel Arch Bridges. Daniel B. Luten. (Paper read before the Indiana Eng. Soc.) (18) Jan. 30.
Construction of the Globe Island Bridge. Sydney, New South Wales.* John Plummer. (19) Feb. 6.
Strain Sheet and Specifications for a Four-Truss Double-Deck Railroad Bridge.* (14) Feb. 6.
Le Pont Troitsky sur la Néva à Saint Petersbourg.* P. Bodin. (33) Jan. 23.

Electrical.

Wireless Telegraphy. Edmund A. N. Pochin. (63) Sup., Vol. 154.
Transmission and Distribution by Single-phase Alternating Current. E. W. Monkhouse, M. Inst. C. E. (63) Sup., Vol. 154.
A Graphic Recording Ammeter.* A. H. Armstrong. (42) Nov.
The Comparative Behavior of Floating and Booster-Controlled Batteries on Fluctuating Loads.* Lamar Lyndon. (42) Nov.
The Electrical Conductivity of Commercial Copper.* Lawrence Addicks. (42) Nov.
Electricity in the Bottle Industry.* R. M. Hopkins. (69) Jan.
Stepney Borough Council Electricity Works.* (73) Jan. 8.
The Albion System of Magneto Ignition for Internal Combustion Engines.* (73) Jan. 8.
The Localization of Breaks in Submarine Cables. (26) Jan. 8.
A Rolling Mill Directly Driven by Electric Motors. (13) Jan. 14.
A New Potentiometer. W. Clark Fisher. (73) Jan. 15.
An Emergency or Master Switch for Central Stations. W. M. Thornton. (73) Jan. 15.
Swindon Corporation Electricity Supply Works.* (26) Jan. 15.
Electricity in a Cotton Mill.* (26) Jan. 15.
Testing Large Alternators. W. E. Burnand. (73) Jan. 15.
A Critical Review of Electrostriction. Louis T. More. (27) Jan. 16.
Blockmann Radio-Telegraph System.* A. Frederick Collins. (27) Jan. 16.
Measurement of Current by Copper Voltameter. J. L. Dickson. (27) Jan. 16.
Single-Phase Condenser Motor.* (27) Jan. 16.
The Grounded Neutral. R. S. Hale. (27) Jan. 16; (24) Jan. 25.
The De Forest Wireless Tests across the Irish Channel.* (46) Jan. 16.
The Lorimer Automatic Telephone System.* (27) Jan. 16.
The Use of Concrete Blocks in Manhole Construction.* Hugh C. Baker, Jr. (13) Jan. 21.
Lamme's Single-Phase Motor Patent. (73) Jan. 22.
Electric Power in Queensland Railway Workshops.* (73) Jan. 22.
On the Magnetic Dispersion in Induction Motors, and Its Influence on the Design of These Machines. Hans Behn-Eschenburg. (Abstract of Paper read before the Inst. of Elec. Engrs.) (73) Serial beginning Jan. 22.
Three-Phase Working with Special Reference to the Dublin System.* William Drew. (Paper read before the Inst. of Elec. Engrs.) (73) Serial beginning Jan. 22.
The Transformation of Thermochemical Energy into Voltaic Energy or Electromotive Force. D. Tommasi. (26) Jan. 22.
A Method of Photographing Alternating-Current Wave Form.* C. J. Spencer. (27) Jan. 23.
Coal Consumption in Central Stations. Alfred S. Giles. (Abstract of Paper read before the Inst. of Elec. Engrs.) (73) Jan. 22; (47) Jan. 23.
The Choice of Air Gap Diameter for Induction Motors. H. M. Hobart. (27) Jan. 23.
The Electric Drive as Applied in a Modern Machine Shop.* (27) Jan. 23.
The New Automatic Telephone Exchange at Grand Rapids, Mich.* Edward J. Hart. (27) Jan. 23.
Electrical Foucault Pendulum Systems.* Ernest K. Adams. (27) Jan. 30.
Electric Heating Equipment of a Modern Hat Factory.* Max Loewenthal. (27) Jan. 30.
Electric Pumping Plant at Mobile, Ala.* (14) Jan. 30.

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* Illustrated.

Electrical—(Continued).

The Theoretical Determination of Power Curves. William J. Berry. (**27**) Jan. 30.
Hookham's Prepayment Electricity Meter.* (**47**) Jan. 30.
The Siskiyou Power Transmission.* (**27**) Jan. 30.
The Individual Application of Electric Motors to Machinery, with Rules for Determining the Size of Motors. William Cooper. (**10**) Feb.
Construction and Maintenance of Electric Wires. (Abstract of Paper read before the Amer. Soc. of Mun. Improvements.) (**60**) Feb.
Some Electrically Operated Cranes for Railway and Harbor Work.* Frank C. Perkins. (**41**) Feb.
Portable Electric Drilling and Riveting Machines.* Frank C. Perkins. (**10**) Feb.

Marine.

Drilled *versus* Punched Rivet-Holes in the Hulls of Steel Ships. A. F. Yarrow, M. Inst. C. E. (**63**) Sup., Vol. 154.
Screw-Shafts. John List, M. Inst. C. E. (**63**) Sup., Vol. 154.
Marine Propellers with Non-Reversible Engines and Internal-Combustion Engines.* Rankin Kennedy. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (**47**) Jan. 9.
The Chilian Battle-ship *Libertad*.* (**11**) Jan. 15.
A New Method of Coaling War Vessels at Sea. (**13**) Jan. 21.
An Air Valve for Regulating the Time of Passing through an Air Lock; Used in the Kiel Dry-Dock Construction.* (**13**) Jan. 21.
New Japanese Armored Cruisers *Kasaga* and *Niasin*.* (**46**) Jan. 23.
The Mietz & Weiss Two-Cylinder Marine Kerosene Engine.* (**20**) Jan. 28.
Frenchman's Bay Coaling Plant.* (**14**) Jan. 30.
Attaque et Défense des Cotes au Moyen des Torpilles.* H. Noalhat. (**36**) Serial beginning Jan. 10.

Mechanical.

Tests of the Efficiency of Hoisting Tackle. S. P. Mitchell, M. Am. Soc. C. E. (**54**) Vol. 51.
Theory of Centrifugal Pumps and Fans: Analysis of Their Action, with Suggestions for Designs.* Elmo G. Harris, M. Am. Soc. C. E. (**54**) Vol. 51.
Internal-Combustion Engines for Driving Dynamos. Herbert A. Humphrey, M. Inst. C. E. (**63**) Sup., Vol. 154.
Speeds of Overhead and Other Cranes for the Economic Handling of Material. Archibald Potter Head, M. Inst. C. E. (**63**) Sup., Vol. 154.
Steam Turbines. Prof. Rateau. (**63**) Sup., Vol. 154.
The Use of Petrol Motors for Locomotion. E. Sauvage. (**63**) Sup., Vol. 154.
Mechanical Draft. J. J. Brown, M. Am. Soc. M. E. (**69**) Nov.
Modern Fuel Economy. George E. Walsh. (**69**) Nov.
The Drive of Machine Tools.* Charles W. Startsman. (**69**) Nov.
The Condenser.* J. J. Brown, M. Am. Soc. M. E. (**69**) Dec.
The Modern Economic Factory Light. Fred R. Davis. (**69**) Dec.
Improved Mechanical Stoking. (**69**) Jan.
The Evolution of the Rotary Kiln. Benton G. Boilleau and C. W. Lyon. (**67**) Jan.
The Harrisburg Engine System.* (**69**) Jan.
The Steam Superheater.* John Primrose. (**69**) Jan.
The Siemens Electrical Pyrometer.* (**22**) Jan 1.
A Modern American Foundry.* (**12**) Jan. 8.
Coal Screening and Washing Plant at a German Colliery.* (**57**) Jan. 8; (**22**) Jan. 8.
Merchant Bar Mill of the International Harvester Company.* (**22**) Jan. 8.
The Design of Steam Turbine Discs. Frank Foster. (**12**) Jan. 8.
The Vogt Gas-Engine.* Herbert A. Humphrey, M. Inst. C. E., M. I. Mech. E. (**11**) Jan. 8.
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A Two-Cylinder Portable Steam or Air Motor.* (**20**) Jan. 14.
Brick Making Plant of the Western Brick Co., Danville, Ill.* (**13**) Jan. 14.
Coal and Ash Handling Plant of the New York Rapid Transit Power House.* (**13**) Jan. 14.
The Brown & Sharpe No. 2-A Universal Milling Machine, Motor Driven.* (**20**) Jan. 14.
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Notes on the Design of Rolls.* Emil Kirchberg. (From *Stahl und Eisen*.) (**22**) Jan. 22.
Coal Consumption in Central Stations. Alfred S. Giles. (Abstract of Paper read before the Inst. of Elec. Engrs.) (**73**) Jan. 22; (**47**) Jan. 23.

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The Cincinnati Gear Compressor for the St. Louis Exposition.* (14) Jan. 23; (20) Jan. 21.
Air Compressors for St. Louis Exposition.* (18) Jan. 23.
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Design for a Gasoline Motor.* J. C. Brocksmith. (47) Jan. 23.
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A New Source of Economy for Gas Works: Firebrick Making at the Crystal Palace District Gas Company's Works.* (24) Jan. 25.
The Economic Admission of Steam to Water Gas Producers of the Lowe Type. G. W. M'Kee. (Paper read before the Soc. of Chemical Industry.) (24) Jan. 25.
A New Charcoal Retort Plant.* Ernst A. Sjöstedt. (20) Jan. 28.
A Substitute for Looped Hose on Traveling Air Hoists.* (20) Jan. 28.
Alteration of Fire-Brick by Furnace-Gases.* (62) Jan. 28.
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Smoke Prevention. R. P. King. (Abstract of Paper read before the Indiana Eng. Soc.) (13) Jan. 28.
The Norton New 14-Foot Grinding Machine.* (20) Jan 28.
The Sand-Lime Brick Industry in this Country.* (20) Jan. 28.
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Line of Progress in the Efficiency of the Combustion Motor.* Edward C. Warren. (9) Feb.
Mechanical and Commercial Aspects of the Alcohol Motor.* Henri Dupays. (9) Feb.
Motor-Driven Machine Tools ; Planer Driving by Electric Motors.* (25) Feb.
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The Didier-Stettiner System of Inclined Retorts in England.* (24) Serial beginning Feb. 8.
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Les Moteurs a Gaz Pauvre. A. Abraham. (36) Serial beginning Jan. 10.
Les Progrès de l'Automobilisme en 1903.* F. Drouin. (33) Serial beginning Jan. 16.

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Alloys of Iron, Manganese and Nickel. R. A. Hadfield, M. Inst. C. E. (63) Sup., Vol. 154.
The Dangerous Crystallization of Mild Steel and Wrought Iron.* J. O. Arnold. (63) Sup., Vol. 154.
The Continuous Production of Open-Hearth Steel from Molten Blast-Furnace Metal. Benjamin Talbot. (63) Sup., Vol. 154.
The Equalization of Hot-Blast Temperatures for Blast-Furnaces.* Joseph Hutchinson Harrison, M. Inst. C. E. (63) Sup., Vol. 154.
Notes on the Metallurgy of Copper of Montana. H. O. Hofman. (7) Dec.
Ore Dressing or the Mechanical Preparation of Ores. Robert H. Richards. (7) Dec.
The Physical Structure of Metals and Alloys.* J. J. Kessler, Jr. (Abstract of Paper read before the Engineers' Club of St. Louis.) (1) Dec.

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Side Blow Converters. N. Lilienberg. (Paper read before the Philadelphia Foundrymen's Assoc.) (**20**) Jan. 14.
The Electric Smelting of Iron and Steel.* (**22**) Jan. 15.
Thermit: Its Value in Motive Power Repairs. (**18**) Jan. 16.
Hearth Area and the Number of Tuyeres in Blast Furnace Practice. (**62**) Jan. 21.
The Delprat or Salt-Cake Process for Mixed Sulphides. Donald Clark. (**16**) Jan. 21.
Sixth Report to the Alloys Research Committee on the Heat Treatment of Steel. (Read before the Inst. Mech. Engrs.) (**11**) Serial beginning Jan. 22; abstract (**12**) Jan. 22.
The Heat Treatment of Steel.* Wm. C. Roberts-Austen and William Gowland. (**47**) Serial beginning Jan. 23.
Improvements in Cyanidation. Alfred James. (**16**) Jan. 28.
The Platz Method of Calculating Furnace Burdens. J. B. Nau. (**20**) Jan. 28.
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A New Reheating Furnace.* (**20**) Jan. 28.
Notes on Cupolas and Cast Iron. C. Morehead. (Abstract of Paper read before the Rugby Eng. Soc.) (**47**) Jan. 30.
Recent Investigations and Discoveries in Cast Iron.* Alexander E. Outerbridge, Jr. (**3**) Feb.
Steel Castings. I. L. Knox. (**62**) Feb. 4.
The Baby Bessemer Works and Their Costs. Ludwig Unckenbolt. (From *Stahl und Eisen.*) (**62**) Feb. 4.
Light Aluminum Alloys. (**19**) Feb. 6.

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Percussion Coal-Cutters. Sir Thomas Wrightson, M. Inst. C. E., and John Morison, M. Inst. C. E. (**63**) Sup., Vol. 154.
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Gold Dredging.* F. Winter Taylor. (**16**) Jan. 14.
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Iron Shaft Fittings with Cage Guides on One Side.* F. Schulte. (**57**) Jan. 15.
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Testing Caps or Detonators in the Laboratory.* A. W. Warwick. (**45**) Feb.
The Spraying or Watering Problems. James Ashworth. (**45**) Feb.
Mine Ventilation. W. J. Mollison. (Paper read before the Central Min. Inst. of Western Pennsylvania.) (**45**) Feb.
Mechanical Devices at Coal Mines.* L. L. Logan. (Paper read before the Central Min. Inst. of Western Pennsylvania.) (**45**) Feb.
Testing Explosives in Germany and Belgium.* (**62**) Feb. 4.

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The Metric System. Charles. F. Hauss. (**70**) Jan.
Caisson Disease and a Safety Apparatus for Pneumatic Caisson Locks.* (**14**) Jan. 23.

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An Example of Thin Macadam Road Construction along the Charles River, Mass.* J. Albert Holmes. (**13**) Jan. 14.
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Making Cement Roadways in Richmond, Ind. H. L. Weber. (**13**) Jan. 28.
Paving Brick for Street Railway Track.* (**13**) Jan. 28.
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Concrete Foundations and Cement Filler for Brick Pavements: A Comparison of Natural Cements and Portland. O. L. Gearheart. (Abstract of Paper read before the Ill. Soc. of Engrs. and Surveyors.) (**13**) Feb. 4.
Goudronnage de Chaussées dans le Département de Seine-et-Marne. (**43**) 2e Trimestre, 1903.
Suppression de la Poussière des Chaussées Empierrées par le Goudronnage et l'Emploi d'Enduits Collants. M. Le Gavrian. (**43**) 2e Trimestre, 1903.
Goudronnage et Petrolage des Routes. J. Feugeres. (**35**) Serial beginning Jan.

Railroad.

Some Railway Construction in Oklahoma.* A. G. Allan, Assoc. M. Am. Soc. C. E. (**54**) Vol. 51.
High-Speed Electric Traction on Railways.* J. W. Jacomb-Hood, M. Inst. C. E. (**63**) Sup., Vol. 154.
Automatic Signalling.* William John Cudworth, M. Inst. C. E. (**63**) Sup., Vol. 154.
The Design of Permanent-Way and Locomotives for High Speeds. James Charles Inglis, M. Inst. C. E. (**63**) Sup., Vol. 154.

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Design and Operation of Division and Tide-Water Terminals.* C. L. Bardo. (65) Dec.

Duplex Valve Gear, London and North-Western Railway.* (12) Jan. 8.

Electrification of the Liverpool, Southport and Crossens Section of the Lancashire and Yorkshire Railway.* (11) Jan. 8; (17) Jan. 30.

Prussian State Railway Locomotives. (Abstracts from the Specifications of the Prussian State Railways.) (11) Jan. 8.

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Seaboard Air Line Shops at Portsmouth, Va.* (40) Jan. 15.

Locomotive Operation: A Technical and Practical Analysis.* G. R. Henderson, M. Am. Soc. M. E. (40) Jan. 15.

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Installation of a Coughlin-Sanford Swing-Rail Frog and Switch Point Lock on the I. C. R. R.* (18) Jan. 16.

The Pennsylvania Tunnel at New York City.* (46) Jan. 16.

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Notes on Early Canadian Transcontinental Railway Projects. (13) Jan. 21.

A Complete Journal Box.* (18) Jan. 23; (40) Jan. 22.

British Locomotive Work in 1903. Charles Rous-Marten. (12) Jan. 22.

Compound Goods Locomotive, Saxony State Railways.* (12) Serial beginning Jan. 22.

The Scheinig-Hofmann Shoe Rail-Joints.* (11) Jan. 22.

Locomotives for the Cape Government Railways.* H. W. Hanbury, Assoc. M. Inst. C. E. (11) Jan. 22.*

Telescopic Snow Sheds on the Central Pacific.* (15) Jan. 22.

Baldwin Four-Cylinder Balanced Compound Locomotives for the Santa Fé.* (15) Jan. 22.

Chesapeake & Ohio Eight-Wheel Switching Locomotive.* (40) Jan. 23.

Railroad Car Heating by Steam and Compressed Air.* (47) Jan. 23.

The Arnold Electro-Pneumatic Railway System.* B. J. Arnold. (47) Serial beginning Jan. 23.

Electrification of the Northeastern of England.* (40) Jan. 23.

Higher Braking Power for Freight Cars. Robert H. Blackall. (Paper read before the Railway Club of Pittsburg.) (18) Jan. 23.

Heavy Goods Engine for the Bengal-Nagpur Railway.* (19) Jan. 23.

The Pressure Retaining Valve: Its Value and Importance.* F. H. Parke. (15) Jan. 29.

Side-Bearing Trucks.* W. J. Knox. (40) Jan. 29.

Big Four Revision between Cincinnati and Sunman.* (40) Jan. 29.

Switching Locomotive for the Pennsylvania Lines.* (40) Jan. 29.

The Wabash Terminal at the World's Fair Grounds, St. Louis.* (15) Jan. 29.

Electrification of an English Steam Railway.* (27) Jan. 30.

Simple Consolidation Locomotive for N. Y. C. & H. R. R. R.* (18) Jan. 30.

An Important New Terminal-Yard Lighting and Power Plant, Weehawken, N. J.* (25) Serial beginning Feb.

A New 50-ton Box Car, with Structural Steel Underframe.* (25) Feb.

Coal Chutes for Locomotives.* (25) Feb.

Indicator Tests of a Large Tandem Compound, Atchison, Topeka & Santa Fé Railway.* (25) Feb.

Water Softening—Union Pacific Railway. (25) Feb.

Locomotives for Special Service on British Railways.* J. F. Gairns. (9) Feb.

Notes on Railroad Construction from the Resident Engineers' Standpoint. F. C. French, Assoc. M. Am. Soc. C. E. (Paper read before Iowa Eng. Soc.) (13) Feb. 4; (14) Serial beginning Jan. 30.

Flood Repairs to the Lehigh & Susquehanna Division of the Central Railroad of New Jersey.* M. A. Zook, M. Am. Soc. C. E. (13) Feb. 4.

An All Cast-Iron Turn-Table.* Jas. C. Bennett. (16) Feb. 4.

Steel Coke Car of Vanderbilt Design. (40) Feb. 5.

Grade Crossing Protection Between Steam and Electric Railways.* (40) Feb. 5.

The Maximum Economical Load for a Locomotive. C. T. Noyes. (Abstract of Paper read before the Pacific Coast Ry. Club.) (15) Feb. 5.

Consolidation Locomotive for the Central Railroad of New Jersey.* (40) Feb. 5.

Gas Engines in Railroad Work.* (15) Feb. 5.

Forty-Ton Coal Car with Steel Underframe.* (15) Feb. 5.

Indicateur-Enregistreur de Vitesse pour Locomotives: Système Flaman. A. Morizot. (34) Jan.

La Nouvelle Voiture Automobile à Vapeur du Chemin de Fer du Nord. Félix Sartiaux and J. Koechlin. (38) Jan.

Chauffage des Trains du Réseau de l'Est par la Vapeur et l'Air Comprimé Combinés.* H. Guerin. (33) Jan. 2.

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* Illustrated.

Railroad—(Continued).

Frein à Vis, Système Schmid, Actionné par la Vide ou par l'Air Comprimé.* (**33**) Jan. 2.

Considérations sur l'Avenir de la Traction Électrique sur les Grandes Lignes de Chemins de Fer. R. Bonnin. (**36**) Serial beginning Jan. 10.

Railroad, Street.

The Position and Protection of the Third Rail on Electric Railways.* William E. Langdon. (**63**) Sup., Vol. 154.

The Relative Advantages of Overhead, Deep-Level, and Shallow Subway Lines, for the Accommodation of Urban Railway Traffic. Stephen Butler Cottrell, M. Inst. C. E. (**63**) Sup., Vol. 154.

The Conditions Governing the Rise of Temperature of Electric Railway Motors in Service. Cary T. Hutchinson. (**42**) Nov.

A New Surface-Contact System for Electric Tramways.* (**73**) Jan. 8.

London County Council Tramways.* (**73**) Serial beginning Jan. 15.

The "G. B." Surface-Contact System.* (**26**) Jan. 15.

Freight and Express Cars for Brooklyn Rapid Transit. (**40**) Jan. 15.

A Modern Electric Railway Power Plant, Canandaigua. N. Y. (**14**) Jan. 16.

Electric Interurban in Western New York.* (**17**) Jan. 16.

Convertible Parlor and Sleeping Car for Electric Railways.* (**18**) Jan. 16.

Electric Power in Queensland Railway Workshops.* (**73**) Jan. 22.

Indianapolis and Northwestern Traction System.* (**17**) Jan. 23.

The Power House of the Interborough Rapid Transit Company, New York.* (**14**) Jan. 23; (**17**) Jan. 23.

Application of Single-Phase Alternating Current for Traction and Railway. B. G. Lamme. (**19**) Jan. 23.

Single-Phase Car Equipment at East Pittsburg.* (**17**) Jan. 23.

London's New Tube Railway.* C. H. Grinling. (**15**) Jan. 29.

New Chicago Union Traction Cars.* (**17**) Jan. 30.

Improvements in the Power Equipment of the Cleveland and Southwestern System.* (**17**) Jan. 30.

The Conneaut & Erie Interurban System.* (**17**) Feb. 6.

The Third-Rail Shoe on the Boston Elevated Railway.* (**17**) Feb. 6.

An Interesting Addition to Convertible Cars for the Washington Water Power Company.* (**17**) Feb. 6.

Storage Air Brake System in St. Louis.* (**17**) Feb. 6.

Water Tube Boilers in English Tramway Stations.* (**17**) Feb. 6.

The Electric Railway System of Vienna.* (**17**) Feb. 6.

St. Louis Transit Company's New Cars and Motors.* (**17**) Feb. 6.

Note sur l'Intérêt Qu'il y Aurait a Fixer Uniformément la Cote de Calage des Roues et le Mode d'Attelage de Tous les Véhicules Circulant sur les Voies de 1 Mètre.* M. Heude. (**38**) Jan.

Traction Électrique avec Moteurs Monophasés.* Emile Dieudonné. (**36**) Jan. 10.

Sanitary.

Sewage Purification. An Informal Discussion. (**54**) Vol. 51.

Bacterial Treatment of Water and Sewage. Percy Frankland. (**63**) Sup., Vol. 154.

Utility Exhaust Heating System.* (**69**) Nov.

Heating and Ventilating of Factories.* (**69**) Nov.

Description of Hot Water Heating Apparatus in the Schioldamn Institution, Copenhagen, Denmark.* A. B. Reck. (**70**) Jan.

Test of a Hot Air Heating Apparatus Using Radiators Instead of Registers.* Geo. M. Aylsworth. (**70**) Jan.

To Figure Heating Work Accurately—With a Table Showing the Losses in British Thermal Units for Various Surfaces. Chas. F. Hauss. (**70**) Jan.

Report on Garbage Collection and Disposal at St. Louis, Mo. (**13**) Jan. 14.

A System of Hot-Water Heating by the Use of Steam. (**14**) Jan. 16.

Steam Heating from a Central Station. F. B. Hofft. (Abstract of Paper read before the Indiana Eng. Soc.) (**13**) Jan. 21; (**24**) Feb. 1; (**60**) Feb.

The Use of Concrete Blocks in Manhole Construction.* Hugh C. Baker, Jr. (**13**) Jan. 21.

Caisson Disease and a Safety Apparatus for Pneumatic Caisson Locks.* (**14**) Jan. 23.

The Necessity of Moisture in Heated Houses. R. C. Carpenter. (Abstract of Paper the Amer. Soc. of Heating and Ventilating Engrs. (**14**) Jan. 23.

Heat Transmission Data for Calculating the Proportions of Heating Systems. (**14**) Jan. 23.

A Battery Furnace Residence Heating System.* C. E. Oldacre. (Abstract of Paper Presented to the Amer. Soc. of Heating and Ventilating Engrs.) (**14**) Jan. 30.

Rubbish Incineration in New York City, and the Design for the New Stanton Street Incinerator.* (**14**) Jan. 30.

Filters *versus* Contact Beds in Sewage Purification.* W. S. Shields. (Abstract of Paper read before the Indiana Eng. Soc.) (**60**) Feb.

The Wear of Sewer Inverts.* E. A. Hermann, M. Am. Soc. C. E. (**13**) Feb. 4.

Aération des Tunnels par Ventilation Mécanique: Systeme Saccardo. (**35**) Jan.

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* Illustrated.

Structural.

The Fatigue of Cement Products. J. L. Van Ornum, M. Am. Soc. C. E. (**54**) Vol. 51.

An Investigation of the Properties of Brick, Under Different Physical Conditions.* Sherman M. Turrill, Assoc. Am. Soc. C. E. (**54**) Vol. 51.

Timber Tests. An Informal Discussion. (**54**) Vol. 51.

Impervious Concrete. An Informal Discussion. (**54**) Vol. 51.

Covering the Natick, Mass., Reservoir with a Concrete Roof.* Frank L. Fuller. (**28**) Dec.

The Protection of Steel from Corrosion. Charles L. Norton. (Extract from Rept. No. IX. of the Ins. Eng. Exp. Station.) (**13**) Jan. 14.

Graphical Determination of Angles in Skew Structural Work.* C. G. Wrentmore. (From the *Michigan Technic*, 1903.) (**13**) Jan. 14.

Supporting an Old Wall from a New Building.* (**14**) Jan. 16.

A Concrete-Steel Factory Building with Fifty-Two-Foot Roof Girders. (**14**) Jan. 16.

Some of the Causes of Recent Failures of Reinforced Concrete. Julius Kahn, Assoc. M. Am. Soc. C. E. (**13**) Jan. 21; (**15**) Jan. 22; (**14**) Jan. 23.

The Power House of the Interborough Rapid Transit Company, New York.* (**14**) Jan. 23; (**17**) Jan. 23.

The Cost of Raw Materials for Portland Cement Manufacture. Morris M. Green. (**14**) Jan. 23.

A Convenient Tie for Concrete Forms.* (**13**) Jan. 28.

The New Engineering Building of the University of Michigan. (**18**) Jan. 30.

Jacking Down Open Cribs for Underpinning.* (**14**) Jan. 30.

Concrete Building Blocks.* (**14**) Jan. 30.

Automatic Spacing of Rivet Holes.* (**13**) Feb. 4.

Efficiencies of Riveted Joints.* Gilbert S. Walker. (**13**) Feb. 4.

The New Henry R. Worthington Hydraulic Works at Harrison, N. J.* (**14**) Serial beginning Feb. 6.

The Kelly & Jones Company's Concrete-Steel Factory Building.* (**14**) Serial beginning Feb. 6.

Steel Roof Trusses in the New Union Railroad Station at Washington.* (**14**) Feb. 6.

More Light on the Theory of Concrete. Spencer B. Newberry. (Paper read before the Ind. Eng. Soc.) (**14**) Feb. 6.

Le Nouvel Hotel de Ville de Tours.* P. Leprince-Ringuet. (**33**) Jan. 9.

La "Maison des Chauteurs" à Strasbourg.* G. Espitallier. (**33**) Jan. 16.

Water Supply.

An Experimental Study of the Resistances to the Flow of Water in Pipes.* Augustus V. Saph, Assoc. Am. Soc. C. E., and Ernest H. Schoder, Jun. Am. Soc. C. E. (**54**) Vol. 51.

Automatic Modules for Regulating the Speed of Filtration.* Charles Anthony, Jr., M. A. M. Soc. C. E. (**54**) Vol. 51.

Steam Turbine Driven Centrifugal Pumps for High Lifts. Cecil West Darley, M. Inst. C. E. (**63**) Sup., Vol. 154.

Raising Water by Compressed Air. Percy Griffith, M. Inst. C. E. (**63**) Sup., Vol. 154.

Pumping by Electricity.* F. H. Pitcher. (**28**) Dec.

The Water Supplies of Southeastern Alaska. Ellen H. Richards. (**7**) Dec.

Covering the Natick, Mass., Reservoir with a Concrete Roof. Frank L. Fuller. (**28**) Dec.

Notes on the Water Supplies in the Black Hills of South Dakota and Vicinity. Ellen H. Richards. (**7**) Dec.

Some Six-Inch Meter Tests and How They Were Made.* Frank C. Kimball, (**28**) Dec.

The Tweeddale Water Purifying System.* (**20**) Jan. 14.

Plant of the Columbus Power Company, Columbus, Georgia.* (**14**) Jan. 16; (**27**) Jan. 23.

Philadelphia's New Fire Fighting Service.* (**20**) Jan. 21.

Water-Power Electrical Development in Northern Indiana.* (**14**) Jan. 23.

Relocating a Large Pumping Main Under Pressure at Philadelphia.* Seth M. Van Loan. (**14**) Jan. 23.

The New Sebago Lake Reservoir of the Portland Water Company.* Edmund M. Blake. (**14**) Jan. 23.

A Flood Test of Two Large Riveted Steel Pipe Lines.* (**14**) Jan. 23.

The Water Softening Plant of the Procter & Gamble Co., Ivorydale, O.* (**13**) Jan. 28.

The Philadelphia Fire-Protection Pumping Station. (**14**) Jan. 30.

A Low-Head Mill Power at Juliette, Ga.* (**14**) Feb. 6.

L'Alimentation Artificielle de la Neste-Aménagement du Lac de Cap-de-Long (Hautes-Pyrénées.* P. Frick. (**33**) Jan. 2.

Méthodes Rapides d'Analyse des Eaux Potables. J. Malette (**36**) Jan. 10.

Importance Hygiénique et Procédés de Captage des Eaux Souterraines Profondes.* Ed. Imbeaux and M. E. Nourtier. (**36**) Serial beginning Jan. 10.

Waterways.

The Levee Theory on the Mississippi River. An Informal Discussion. (**54**) Vol. 51.

Foreshore Protection and Travel of Beaches. William Tregarthen Douglass, M. Inst. C. E. (**63**) Sup., Vol. 154.

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* Illustrated.

Waterways—(Continued).

Dredging, with Special Reference to Rotary Cutters. James Henry Apjohn, M. Inst. C. E. (63) Sup., Vol. 154.
The Modern Equipment of Docks, with Special Reference to Hydraulic and Electric Appliances. Walter Pitt, M. Inst. C. E. (63) Sup. Vol. 154.
Dredging in New South Wales. Cecil West Darley, M. Inst. C. E. (63) Sup., Vol. 154.
Methods of Measuring the Flow of Streams. John C. Hoyt. (13) Jan. 14.
Lord Kelvin's Automatic Tide Predictor.* (19) Jan. 23.
A Concrete-Steel Lighthouse. (14) Jan. 23.
Automatic Tide Gates for the Bolsa Chica Gun Club, California.* Jas. D. Schuyler, M. Am. Soc. C. E. (13) Feb. 4.
The Cache River Drainage Survey. A. H. Bell. (13) Feb. 4.
Floods and Flood Protection Works at East St. Louis, Ill.* James F. Parr. (Abstract of Paper read before the Ill. Soc. of Engrs. and Surveyors. (13) Feb. 4.
Étude Hydrologique du Rhin Allemand et du Main, les Crues et Leur Prévision. Ed. Maillet. (43) 2e Trimestre, 1903.
Hydraulique Fluviale; Vérification Théorique des Lois Empiriques Relatives à la Forme du Lit des Rivières Navigables a Fond Mobile. M. Fargue. (43) 2e Trimestre, 1903.

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* Illustrated.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 3.

MARCH, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that the full title of Paper, name of Author, page reference, and date of presentation to the Society, are given.

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NEW YORK 1904.

Entered according to Act of Congress, by the AMERICAN SOCIETY OF CIVIL ENGINEERS in the office of the Librarian of Congress, at Washington.

American Society of Civil Engineers.

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JAMES D. SCHUYLER.	S. L. F. DEYO.

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Treasurer, JOSEPH M. KNAP.

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The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays Fourth of July, Thanksgiving Day and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER, - - 533 Columbus.
CABLE ADDRESS, - - - - "Ceas, New York."

Vol. XXX. MARCH, 1904. No. 3.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

March 2d, 1904.—The meeting was called to order at 8.40 P. M.; Vice-President S. L. F. Deyo in the chair; Charles Warren Hunt, Secretary; and present, also, 193 members* and 14 guests.

The minutes of the Annual Meeting, and of the meetings of February 3d and 17th, 1904, were approved as printed in *Proceedings* for February, 1904.

The Chair declared the ballot on the proposed Union Engineering Building closed, and appointed Messrs. John G. Van Horne, John C.

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* Registered, but at least 100 failed to register.

Temple, Albert Carr, S. T. Wagner and H. A. La Chicotte as tellers to canvass the ballot.

The Secretary reported that a sufficient number of ballots on the appointment of a Special Committee on "Concrete and Steel-Concrete" had been received to enable a count to be made.

It was moved, seconded and carried, that the matter be referred to the Board of Direction.

A paper by Herbert J. Wild, Jun. Am. Soc. C. E., entitled "Substructure of the Marsh River Bridge," was presented by the author and illustrated with lantern slides. The subject was discussed by G. B. Francis, M. Am. Soc. C. E.

The Secretary presented a letter from Charles G. Darrach, M. Am. Soc. C. E., forwarding some samples of concrete made during freezing weather. The subject was discussed by Messrs. G. B. Francis, R. W. Leslie, J. J. R. Croes, Charles S. Gowen, W. A. Aiken and others.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Charles White Curry, Zacualpan, Vera Cruz, Mexico.
Edwin Lincoln Grimes, Troy, N. Y.
William Bancroft Potter, Schenectady, N. Y.
Richard Quinn, Fort St. Philip, La.
Baird Snyder, Jr., Lansford, Pa.
George Elliott Verrill, New Haven, Conn.
James Gilbert White, New York City.
James Edward Whitfield, Philadelphia, Pa.

As Associate Members.

Charles Edwin Collins, Philadelphia, Pa.
James Dougan, New York City.
John Stanton Ely, Philadelphia, Pa,
Nathan Clifford Grover, Orono, Maine.
Abraham Tracy Hardin, New York City.
Harry Hodgman, Amherstburg, Ont., Canada.
William August Hunicke, St. Louis, Mo.
Joseph Patton McLean, Jersey City, N. J.
Theodore Clifford Phillips, New York City.
Joseph Springer Swindells, Mt. Kisco, N. Y.
Joseph Lee Wickes, Baltimore, Md.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on March 1st, 1904, from the grade of Associate Member to the grade of Member:

As Members.

Cyrus Cates Babb, Washington, D. C.
Cary Talcott Hutchinson, New York City.
Isaac Mathewson, Alarcon, Guerrero, Mexico.
Jay Johnson Morrow, Washington, D. C.
Emmet Abner Steece, Burlington, Iowa.
Samuel Storrow, Los Angeles, Cal.
Taro Tsuji, Tokyo, Japan.

The Secretary announced the election of the following candidates by the Board of Direction on March 1st, 1904:

As Juniors.

Edward Warren Banker, Philadelphia, Pa.
Milo Hamilton Brinkley, Salt Lake City, Utah.
John Otis Burrage, San Francisco, Cal.
Henry Schwing Kleinschmidt, Salt Lake City, Utah.
Thomas Burton McIntire, New York City.
Albert Jefferson Mayell, New York City.
Cornelius Joseph O'Connor, New York City.
Arthur Johnson Sackett, Jacksonville, Fla.

The Secretary presented the report of the tellers appointed to canvass the ballot on the proposed Union Engineering Building, as follows:

"New York, March 2d, 1904.

"The tellers appointed for the purpose report that they have canvassed the ballot on Union Engineering Building, with the following result:

"Total number of ballots found correct and counted		1 801
In favor of the Union	662	
Against the Union	1 139	
	——	1 801

"Respectfully submitted,

"John G. Van Horne,
"John C. Temple,
"Albert Carr,
"Samuel Tobias Wagner,
"H. A. La Chicotte."

Adjourned.

March 16th, 1904.—The meeting was called to order at 8.30 P. M., Foster Crowell, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 107 members and 27 guests.

A paper, by W. D. Taylor, M. Am. Soc. C. E., entitled "The Location of the Knoxville, La Follette and Jellico Railroad, of the Louisville and Nashville System," was presented by the Secretary, who also presented communications on the subject from Messrs. Emile Low, E. J. Beard, William G. Raymond, Walter Watson and William P. Watson.

The paper was discussed further by Messrs. J. G. Tait, F. Lavis and W. H. Coverdale.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

March 1st, 1904.—8.30 P. M.—Vice-President Curtis in the Chair; Charles Warren Hunt, Secretary, and present, also, Messrs. Craven, Ellis, Gowen, N. P. Lewis, and Webster.

The Secretary reported that a sufficient number of votes had been received on the proposition for the appointment of a Special Committee on "Concrete and Steel-Concrete," so that they may be canvassed, under the Constitution, and was instructed to report this fact to the meeting of the Society on the 2d inst.

The seven geographical districts into which the Society has heretofore been divided for the purpose of the Nominating Committee, were adopted for the next year.

Applications were considered and other routine business transacted.

Seven Associate Members were transferred to the grade of Member, and eight candidates for Junior were elected.*

Adjourned.

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* See pages 130 and 131.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, April 6th, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "A Phenomenal Land Slide," by D. D. Clarke, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, April 20th, 1904.—8.30 P. M.—At this meeting, a paper, entitled "Lateral Earth Pressure and Related Phenomena," by E. P. Goodrich, Jun. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, May 4th, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "The Lake Cheesman Dam and Reservoir," by Charles L. Harrison, M. Am. Soc. C. E., and Silas H. Woodard, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

Robert Moore, M. Am. Soc. C. E,, St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
James L. Frazier, " " Frankfort, Ind.
William Jackson, " " Boston, Mass.
Emil Kuichling, " " New York, N. Y.
J. L. Van Ornum, " " St. Louis, Mo.
John F. Wallace, " " Chicago, Ill.
H. J. Pfeifer, Assoc. M. Am. Soc. C. E., St. Louis, Mo., *Secretary.*

INTERNATIONAL ENGINEERING CONGRESS.

The list of subjects for discussion at the Congress, published in the *Proceedings* for February, 1904, has been amended as follows:

Change title of subject No. 32 to read,

32. Mining:
    - *a.* Surveying;
    - *b.* Hoisting;
    - *c.* Ventilation.

Add the following subjects:

34. Gas Engines.
35. Surveying.
36. Ocean Hydrography.
37. Wharves and Piers.

Papers, from the standpoint of American Practice, have already been assured on the various subjects, as follows:

Harbors, Natural Waterways, Artificial Waterways and Fortifications:

By Officers of the Corps of Engineers, U. S. A.

Lighthouses and Other Aids to Navigation:

By Officers of the Lighthouse Board, U. S. A.

Ordnance:

By Officers of the Ordnance Department, U. S. A.

SURVEYING:
By Officers of the U. S. Coast and Geodetic Survey, and H. M. Wilson, Geographer, U. S. Geological Survey.

NAVAL ARCHITECTURE:
By Rear Admiral W. L. CAPPS, Chief Constructor, U. S. N.

MARINE ENGINEERING:
By Professor W. F. Durand, Ithaca, N. Y.

DRY DOCKS:
By Rear Admiral M. T. ENDICOTT, Chief of Bureau of Yards and Docks, U. S. N.

TRAFFIC ON IMPROVED WATERWAYS, etc.:
By EDWARD P. NORTH, New York City.

PURIFICATION OF WATER FOR DOMESTIC USE:
By ALLEN HAZEN, New York City.

PURIFICATION OF WATER FOR THE PRODUCTION OF STEAM:
By J. O. HANDY, Pittsburg, Pa.

TURBINES AND WATER WHEELS:
By Professor GARDNER S. WILLIAMS, Ithaca, N. Y.

IRRIGATION:
By ELWOOD MEAD, Chf. Irrigation Investigations, Washington, D. C.

RAILROAD TERMINALS:
By ELMER L. CORTHELL, New York City.

UNDERGROUND RAILWAYS:
By WILLIAM BARCLAY PARSONS, New York City.

LOCOMOTIVES AND OTHER ROLLING STOCK:
By GEORGE GIBBS, New York City.

LIVE LOADS FOR RAILROAD BRIDGES:
By HENRY W. HODGE, New York City.

THE SUBSTITUTION OF ELECTRICITY FOR STEAM AS A MOTIVE POWER:
By JAMES G. WHITE, New York City.

SEWAGE DISPOSAL:
By GEORGE W. FULLER, New York City.

DISPOSAL OF MUNICIPAL REFUSE:
By RUDOLPH HERING, New York City.

VENTILATION OF TUNNELS:
By CHARLES S. CHURCHILL, Chief Engineer, Norfolk and Western R. R., Roanoke, Va.

HIGHWAYS:
By JAMES OWEN, Newark, N. J., and WILLIAM E. MCCLINTOCK, Boston, Mass.

CONCRETE AND CONCRETE-STEEL:
By EDWIN THACHER, New York City.

DEEP FOUNDATIONS:
By JOHN F. O'ROURKE, New York City.

THE MANUFACTURE OF STEEL:
By WILLIAM METCALF, Pittsburg, Pa.

TESTS OF MATERIALS OF CONSTRUCTION:
By WILLIAM R. WEBSTER, Philadelphia, Pa.

PASSENGER ELEVATORS:
By THOMAS E. BROWN, New York City.

PUMPING MACHINERY:
By IRVING H. REYNOLDS, Youngstown, Ohio.

CENTRIFUGAL PUMPS:
By William Mayo Venable, New Orleans, La.

DREDGES: THEIR CONSTRUCTION AND PERFORMANCE:
By A. W. ROBINSON, Montreal, Canada, and F. B. MALTBY, Memphis, Tenn.

ELECTRICAL POWER—GENERATING STATIONS AND TRANSMISSION:
By L. B. STILLWELL, New York City.

ENGINEERING EDUCATION:
By Professor ROBERT FLETCHER, Hanover, N. H., and Professor CALVIN M. WOODWARD, St. Louis, Mo.

WHARVES AND PIERS:
By JOHN A. BENSEL, New York City.

Advices recently received indicate much interest in the Congress in Europe, and many papers from England, France, Holland and other foreign countries seem to be assured.

THE *TECHNOLEXICON* OF THE SOCIETY OF GERMAN ENGINEERS.

At the request of Dr. Hubert Jansen, Editor-in-Chief of the *Technolexicon* of the Verein Deutscher Ingenieure, the following announcement is made:

"The universal technical dictionary for translation purposes, in English, German and French, the compilation of which was begun in 1901 under the auspices of the Society of German Engineers, has received help, up to the present time, from 363 technical societies at home and abroad: 51 of these are English, American, South African, etc., 274 German, Austrian, and German-Swiss, and 38 French, Belgian, and French-Swiss societies. Of firms and individual collaborators, 2 573 have promised contributions.

"The excerption of texts in one, two or three languages (handbooks, pamphlets, business-letters, catalogues, price-lists, etc.), and of the existing dictionaries has yielded 1 920 000 word-cards so far. To these will be added within the next two years (by the middle of 1906) the hundred thousands of word-cards that will form the result of the original contributions—those already sent in and those still expected—of the 2 573 collaborators at home and abroad, when the editors in Berlin have finished them for the press. Specially made handy note-books had been placed at the disposal of the collaborators to write their collections in, of which 317 have come in filled so far.

"All the outstanding contributions will be called in **by Easter of this year, 1904.** The collaborators are therefore requested to close their note-books or other contributions—unless a later term has been especially arranged with the Editor-in-Chief—by the end of March and to forward them to the address given below. As the printing of the *Technolexicon* is to begin in the middle of 1906, delayed contributions can be made use of in exceptional cases only up to that time.

"The Editor-in-Chief will be pleased to give any further information wanted. Address: Technolexicon, Dr. Hubert Jansen, Berlin (N. W. 7), Dorotheenstrasse 49."

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From February 10th to March 8th, 1904.

DONATIONS.*

CAMBRIA STEEL.

A Handbook of Information Relating to Structural Steel Manufactured by the Cambria Steel Co., Containing Useful Tables, Rules, Data and Formulæ for the Use of Engineers, Architects, Builders and Mechanics. Leather, 7 x 4 ins., 10 + 464 pp., illus. Philadelphia, Cambria Steel Co., 1903. $1.00.

This sixth edition of the handbook contains all the data of the fourth and fifth editions, which have been corrected and revised where necessary. It also contains a considerable amount of new matter relating to new sections of angles and T-bars, and additional sizes of billets, blooms, ingots, and edged and sheared plates. The weights of angles, Z-bars and T-bars now given are those adopted as standards by the Association of American Steel Manufacturers. Other new matter, which has been introduced, consists of tables of safe loads and dimensions for plate and angle columns and for Z-bar columns with side plates. Tables have been added showing the section moduli and moments of inertia for all the built-up columns for which the safe loads are tabulated, which values will be of assistance in cases where it is necessary to consider the effect of eccentric loads in figuring the strength of the columns. Tables of safe loads for angles, T-bars and Z-bars acting as beams with uniformly distributed loads have also been inserted.

LES POMPES.

Par R. Masse. Préface de M. Hatton de la Goupillière. Cloth, 11 x 8 ins., 16 + 528 pp., illus. Paris, Vve. Ch. Dunod, 1903. 32 francs.

This work is made up largely of articles written by the author for the *Revue de Mécanique*, and his descriptions of the various types of pumps exhibited at the Paris Exposition of 1900. The general principles governing the subject are set forth in the first chapter which comprises a brief epitome of the theory of hydraulics, the function and work of pumps, motive power, steam engines, electric motors and the older and simpler forms of hand pumps. The theory and construction of the various types of pumps in general use are next treated, the text being illustrated by a large number of figures including numerous sections showing details of construction. Both direct and indirect acting pumps are treated, and numerous examples of each class are shown. The important subjects of rotary and centrifugal pumps are treated in Chapter III, while Chapter IV treats of pulsometers and injectors. Fire-engines and fire-boats are treated also in the last chapter.

ALTERNATING CURRENTS:

Their Generation, Distribution, and Utilization. By George T. Hanchett, M. Am. Inst. E. E. Cloth, 7½ x 5 ins., 175 pp., illus. New York, John Wiley & Sons, 1904. $1.00 net.

The preface states that there are to-day many practical engineers of experience in charge of lighting and power plants and construction work who have a thorough knowledge of direct-current work in all its various branches, yet a comparatively vague idea of the phenomena of alternating currents and the apparatus for their generation and utilization. This is especially true in connection with polyphase systems, which are becoming more and more generally used, and which possess, in many cases, advantages over the direct-current and single-phase alternating-current systems. The endeavor of this book is to explain as clearly and simply as possible, the phenomena as well as the apparatus of alternating currents of electricity in their various practical phases. The Contents are: Hydraulic Analogies of Inductance and Capacity Combinations; Alternating Current Principles; Single Phase Constant Potential Transformers; Phase Difference and Vector Summation; Copper Calculations for Polyphase Circuits; Alternating Current Measurements; The Induction Motor; The Rotary Converter; Alternating Current Generators and Synchronous Motors; The Management of Alternating Current Machinery; Management of Induction Motors.

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*Unless otherwise specified, books in this list have been donated by the publishers.

LES MOTEURS A ESSENCE POUR AUTOMOBILES.

Leçons Professées en 1903–1904 à la Faculté des Sciences de l'Université de Bordeaux. Par L. Marchis. Paper, 10 x 6½ ins., 15 + 470 pp., illus. Paris, Vve. Ch. Dunod, 1904. Broché, 15 francs; cartonné, 16 francs, 50.

The desire to interest readers who are skilled in the mechanical arts and who understand the principles on which rest the construction and the functions of automobile motors has led the author to limit his subject to the study of the *moteurs à essence* alone. He has discussed the question with its developments, and has furnished information for industrial practice. The Contents are: Le Dévelopment de l'Industrie Automobile; Les Types de Moteurs à Explosion Employés en Automobilisme; Le Refroidissement des Moteurs; Distribution; Échappement; Régulation; Réservoirs; Les Carburateurs; Allumage par des Procédés non Électriques; Allumage Électrique par Étincelle d'Induction; Allumage par Magnétos et par Dynamos; Équilibrage des Moteurs en Général et plus Particulièrèment des Moteurs à Explosion. There is an index of six pages.

Gifts have also been received from the following:

Am. Electrochemical Soc. 1 pam.
Am. Inst. Min. Engrs. 1 bound vol.
Am. Iron and Steel Assoc. 1 pam.
Am. Ry. Assoc. 1 pam.
Assoc. Amicale des Anciens Élèves de l'École Centrale. 1 vol.
Bituminous Coal Trade Assoc. 1 pam.
Blanchard, Arthur H. 1 bound vol.
Boston, Mass.—Statistics Dept. 1 vol.
Brough, B. H. 1 pam.
Buffalo, N. Y.—Dept. of Pub. Works. 1 vol.
Canada—Geol. Surv. Dept. 1 vol.
City Record. 2 bound vol.
Clifton Power Co. 3 pam.
Coll. of the City of N. Y. 1 pam.
Colo.—Agri. Exper. Station. 4 pam.
Columbia Univ. 1 vol., 2 pam.
Delaware, Lackawanna & Western R. R. Co. 1 pam.
Deutsch-Amerikanischer Techniker-Verband. 1 pam.
Fall River, Mass.—Watuppa Water Board. 1 pam.
Fisk, W. L. 1 vol.
France—Ministre des Travaux Publics. 1 pam.
Great Britain—Patent Office. 12 pam.
Ill.—Agri. Exper. Station. 5 pam.
Inst. of Civ. Engrs. of Ireland. 1 vol.
Iron & Steel Inst. 1 bound vol.
Judson, Wm. P. 1 pam.
Kenyon, G. C. 2 pam.
Königliche Technische Hochschule zu Berlin. 1 pam.
League of Am. Municipalities. 1 pam.
McGill Univ. 1 bound vol.
Mich.—State Board of Health. 1 pam.
Middletown, Conn.—Water Commrs. 1 pam.
Midland Ry. Co. 1 pam.
Miller, Hiram A. 1 pam.
Minneapolis & St. Louis R. R. Co. 1 pam.
N. J.—Board of Health. 1 pam.
N. Y. City—Board of Health. 1 pam.
N. Y. City—Commr. of Pub. Works. 1 pam.
N. Y. City—Municipal Explosives Comm. 1 vol.
Ontario—Registrar-Gen. 1 pam.
Poor's Ry. Manual Co. 1 pam.
Quinette de Rochemont, E. T. 1 pam.
St. Paul, Minn.—Board of Water Commrs. 1 pam.
Sims, A. V. 1 pam.
Southern Pacific Co. 1 pam.
Univ. of Mich. Lib. 1 pam.
Univ. of Pa. 1 pam.
U. S. Light-House Board. 2 pam.
Victoria—Legislative Assembly. 1 pam.
Western Ry. Club. 1 vol.
Woodbury, C. J. H. 1 bound vol.

BY PURCHASE.

Testing of Electro-Magnetic Machinery and other Apparatus. By Bernard Victor Swenson and Budd Frankenfield. Vol. I. Direct Currents. New York, The Macmillan Company, 1904.

Wireless Telegraphy and Telephony: A Comprehensive Exposition of the Progress made by Wireless Telegraphy from Early Beginnings; Followed by a Popular Description of the Method and the Instruments Used in the Orling-Armstrong System of Wireless Telegraphy and Telephony through the Ground. Compiled by Maurice Ernst. London, *Electricity* Office.

Engine Tests and Boiler Efficiencies. By J. Buchetti. Translated and Edited from the Third Edition by Alexander Russell, M. I. E. E. Westminster, Archibald Constable & Co., Ltd., 1903.

Die Entwickelung des Niederrheinisch-Westfälischen Stein=kohlen-Bergbaues in der zweiten Hälfte des 19. Jahrhunderts. Herausgegeben vom Verein für die bergbaulichen Interessen im Oberbergamtsbezirk Dortmund in gemeinschaft mit der Westfälischen Berggewerkschaftskasse und dem Rheinisch-Westfälischen Kohlensyndikat. Vol. 1. Berlin, Julius Springer, 1903.

Die Wagner=Fennel'schen Tachymeter. Der Fabrik geodätischer Instrumente von Otto Fennel Söhne in Cassel. Dritte verbesserte Auflage. Von Adolf Fennel. Stuttgart, Konrad Wittwer, 1904.

Maps: Their Uses and Construction. A Short Popular Treatise on the Advantages and Defects of Maps on Various Projections, Followed by an Outline of the Principles Involved in their Construction. By G. James Morrison. Second Edition, Revised and Enlarged. London, Edward Stanford, 1902.

The Encyclopedia Americana. A General Dictionary of the Arts and Sciences, Literature, History, Biography, Geography, etc., of the World. New York, Chicago, The American Company.

The World Almanac and Encyclopædia, 1904. New York, The Press Publishing Co., New York World, 1904.

The Removal and Disposal of Town Refuse. By William H. Maxwell. London, The Scientific Publishing Company, Ltd., 1898.

Résistance des Matériaux Appliquée aux Constructions: Methodes Practiques par le Calcul et la Statique Graphique. Vol. 1. Paris, Vve. Ch. Dunod, 1904.

The Official Report of the International Fire Prevention Con=gress Convened by the Executive of the British Fire Prevention Committee, Held in London, July 6th to 9th, 1903. London, British Fire Prevention Committee, 1903.

Annuaire Statistique et Descriptif des Distributions d'Eau de France, Algérie, Tunisie, Belgique, Suisse et Grand-Duché de Luxembourg. Par Imbeaux, Hoc, Van Lint et Peter. Paris, Vve. Ch. Dunod, 1903.

SUMMARY OF ACCESSIONS.

February 10th to March 8th, 1904.

Donations (including 5 duplicates)	80
By purchase	19
Total	99

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Babb, Cyrus Cates. Engr., U. S. Geological Survey, Washington, D. C.	Jun. Assoc. M. M.	Feb. 2, 1892 Feb. 3, 1897 Mar. 1, 1904
Cunningham, Joseph Hooker. 661 Worcester Blk., Portland, Ore.	Assoc. M. M.	Sept. 6, 1899 Feb. 2, 1904
Grimes, Edwin Lincoln. Chf. Engr., Bureau of Water Supply, 47 State St., Troy, N. Y.		Mar. 2, 1904
Handbury, Thomas Henry. Lt.-Col., Corps of Engrs., U. S. A., Room 92, Flood Bldg., San Francisco, Cal.		Feb. 3, 1904
Hutchinson, Cary Talcott. Cons. Elec. Engr., 56 Pine St., New York City	Assoc. M. M.	Mar. 4, 1896 Mar. 1, 1904
Morrow, Jay Johnson. Capt., Corps of Engrs., U. S. A., Asst. to Engr. Commr. of the District of Columbia, District Bldg., Washington, D. C.	Assoc. M. M.	June 5, 1901 Mar. 1, 1904
Sanders, William Horatio. 915 Grand View Ave., Los Angeles, Cal.		Feb. 3, 1904
Scarborough, Francis Winthrop. Engr., M. of W., C. & O. Ry., Richmond, Va.	Jun. Assoc. M. M.	Sept. 3, 1890 Mar. 6, 1895 Feb. 2, 1904
Snyder, Baird, Jr. Asst. Supt., Lehigh Coal & Nav. Co., Lansford, Pa.		Mar. 2, 1904
Steece, Emmet Abner. City Engr., City Hall, Burlington, Iowa	Assoc. M. M.	Dec. 4, 1901 Mar. 1, 1904
Verrill, George Elliot. 603 Elm St., New Haven, Conn.		Mar. 2, 1904
White, James Gilbert. 43 Exchange Pl., New York City		Mar. 2, 1904
Whitfield, James Edward. 406 Locust St., Philadelphia, Pa.		Mar. 2, 1904

ASSOCIATE MEMBERS.

Collins, Charles Edwin. Cons., Civ. and Hydr. Engr., Care, Woodlawn Inn, Pittsfield, Mass.		Mar. 2, 1904
Craig, Philip Insley. Chf. Engr., Phil. & Easton Ry. Co., Easton, Pa.		Feb. 3, 1904
Dougan, James. Asst. Engr. with Clinton & Russell, 32 Liberty St., New York City	Jun. Assoc. M.	Mar. 5, 1901 Mar. 2, 1904
Grover, Nathan Clifford. Engr., U. S. Geological Survey, Orono, Me.		Mar. 2, 1904
Hardin, Abraham Tracy. Engr., M. of W., N. Y. C. & H. R. R. R., Grand Central Station, New York City		Mar. 2, 1904
Hodgman, Harry. Amherstburg, Ont., Canada		Mar. 2, 1904
Hunicke, William August. 2937 Henrietta St., St. Louis, Mo.		Mar. 2, 1904

		Date of Membership.
MacCracken, George Gere. University Heights, New York City	Jun. Assoc. M.	Feb. 5, 1901 Feb. 3, 1904
McLean, Joseph Patton. 31 Highland Ave., Jersey City, N. J.		Mar. 2, 1904
Noble, Clarence Warren. 405 Brooklyn Ave., Kansas City, Mo.		Feb. 3, 1904
Paterson, Harry Thomas. Asst. Engr., U. S. Geological Survey, Roswell, N. Mex.		Feb. 3, 1904
Phillips, Theodore Clifford. Civ. and Hydr. Engr., 635 Park Row Bldg., New York City		Mar. 2, 1904
Pierce, James Wilson. City Engr., City Hall, Cambridge, Mass.		Feb. 3, 1904
Prouty, Edward Nathan. Asst. Prof. of R. R. Eng., Univ. of California, 2237 Vine St., Berkeley, Cal.		Feb. 3, 1904
Schaeffer, Amos. Asst. Engr., Rapid Transit R. R. Comm., 500 West 149th St., New York City		Feb. 3, 1904
Scott, Charles Bruce. Elkins, W. Va.		Feb. 3, 1904
Swindells, Joseph Springer. San., Hydr. and Constr. Engr., 4 West 14th St., Room 3, New York City	Jun. Assoc. M.	Feb. 2, 1897 Mar. 2, 1904
Wickes, Joseph Lee. Commr. of Street Cleaning, City Hall, Baltimore, Md.		Mar. 2, 1904
Young, Eddy Elbert. 426 West 23d St., New York City		Jan. 6, 1904

JUNIORS.

Davies, William Gomer. Care, U. S. Geological Survey, Yuma, Ariz.	Feb. 2, 1904
Mayell, Albert Jefferson. 550 East 164th St., New York City	Mar. 1, 1904
O'Connor, Cornelius Joseph. 1018 Prospect Ave., Bronx, New York City	Mar. 1, 1904
Richmond, Julian Pierre William. 1144 Tinton Ave., New York City	Feb. 2, 1904
Witherell, Frederick Whitefield. Room 1200, Bank for Savings Bldg., Pittsburg, Pa.	Oct. 6, 1903
Yen, Tuck-Ching Strong. Asst. Div. Engr., Canton-Hankow Ry., Canton, China	Dec. 1, 1903

CHANGES OF ADDRESS.

MEMBERS.

Adgate, George	Western Mgr., Foundation & Contr. Co., 509 McCague Bldg., Omaha, Nebr.
Brown, William Maxwell	Engr., Sewerage Works, Met. Water and Sewerage Board, 1 Ashburton Pl., Boston, Mass.

Campbell, John Logan............Chf. Engr., Gasconade Ry. Constr. Co., Prin. Asst. Engr., St. L., K. C. & C. Ry., 512 Frisco Bldg., St. Louis, Mo.

Crump, Ralph Lee................Englewood, N. J.

Davis, Charles E. L. B............Lt.-Col., Corps of Engrs., U. S. A., U. S. Engr. Office, Jones Bldg., Detroit, Mich.

Gifford, George Edwin............Eastern Representative, The King Bridge Co., 277 Broadway, New York City.

Gresham, Robert Hall............302 Bowie St., San Antonio, Tex.

Hall, Benjamin Mortimer.........Civ. and Min. Engr.; Cons. Engr., Reclamation Service, U. S. Geological Survey (Hall Bros.), 409 Temple Court, Atlanta, Ga.

Harlow, James Hayward..........Chf. Engr., Susquehanna Elec. Power Co., 3 East Lexington St., Baltimore, Md.

Hayden, William Wallace........40 Spruce St., Memphis, Tenn.

Ingalls, Owen Lovejoy ....Engr. in Chg. of Manila Sewerage System, Manila, Philippine Islands.

Irwin, James Clark...............518 Grand Central Station, New York City.

Keller, Charles................. Capt., Corps of Engrs., U. S. A., Engr. Officer, Dept. of Mindanao, and Engr., Moro Province, Zamboanga, Mindanao, Philippine Islands.

Kunz, Frederic Charles.........Cons. Engr., Bridge and Constr. Dept., Pennsylvania Steel Co., Steelton, Pa.

Linville, Jacob Hays ....Cons. Engr., 95 East Baltimore Ave., Lansdowne, Pa.

Melcher, Frank Otis.............Gen. Supt., Choc., Okla. & Gulf R. R., Little Rock, Ark.

Serjeant, Hugh...................Asst. Engr., Riversdale, Riversdale Rd., Burswood, Western Australia.

Spring, Francis Joseph Edward....Chairman, Harbor Board, Madras, India.

Stuart, Francis Lee..............Dist. Engr., B. & O. R. R., Room 4, Walsh Bldg., Cumberland, Md.

Taylor, Harry.....................Capt., Corps of Engrs., U. S. A., Engr. Officer, Dept. of Luzon, Manila, Philippine Islands.

Thompson, Benjamin ....41 First National Bank, Chattanooga, Tenn.

Tubbs, Joseph Nelson.............Gen. Insp., State Dept. of Public Works, 57 Rutgers St., Rochester, N. Y.

Tucker, Lester Waldo............187 Columbia Heights, Brooklyn, N. Y.

Vandevanter, Charles Oscar ......(Vandevanter & Hood), 238 Park Ave., Baltimore, Md.

ASSOCIATE MEMBERS.

Atkins, Harold Bedford ....Cons. Engr., Fifth Ave., East, Roselle, N. J.
Brynn, Per .... Care, Am. Bridge Co., Ambridge, Pa.
Burns, Clinton Sumner............Civ., Hydr. and San. Engr. (Burns & McDonnell), 509 Dwight Bldg., Kansas City, Mo.
Burns, Justin....................First Asst. Engr, Canton-Hankow Ry., Canton, China.
Doerfling, Richard George.......Room 91, Flood Bldg., San Francisco, Cal.
Eavenson, Howard Nicholas......Chf. Engr., United States Coal & Coke Co., Gary, McDowell Co., W. Va.
Edwards, Warrick Rigeley........Asst. to Engr., Bridges and Bldgs., B. & O. R. R., Mt. Royal Station, Baltimore, Md.
Fish, John Charles Lounsbury ....Assoc. Prof., Civ. Eng., L. S. Jr. Univ.; Pres., Board of Health of Palo Alto, 382 Lincoln Ave., Palo Alto, Cal.
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Hill, Theodore William..........613 The Nasby, Toledo, Ohio.
Homan, William MacLean.........Bethlehem, Orange River Colony, South Africa.
Howe, George Edward............Care, City Engr.'s Office, Columbus, Ohio.
Llewellyn, Frederick Thomas.... Care, Am. Bridge Co. of N. Y., 100 Broadway, New York City.
Parker, Charles Frederic... ....(Supt. of Socavon Mines), Cia. Minera de Penoles, La Ojuela, Mapimi, Durango, Mexico.
Smith, Pemberton.................Representative, U. S. Steel Products Export Co., Buenos Aires, Argentine Republic.
Thompson, Arthur Webster.......Supt., Wheeling Div., B. & O. Ry., Wheeling, W. Va.
Turner, George Dallas Baird....Gen. Mgr., J. I. C. Min. & Milling Co., Box 377, Salt Lake City, Utah.
Waite, Guy Bennett..............Pres. and Treas., Guy B. Waite Co., 1919 Seventh Ave., New York City.
Waldron, Samuel Payson..........Care, Am. Bridge Co., 7 West 22d St., New York City.
Warrington, Harry Esmond.......Asst. Engr., C., N. O. & T. P. Ry. Co., 66 Ingalls Bldg., Cincinnati, Ohio.

JUNIORS.

Burwell, Robert Lemmon.........187 Columbia Heights, Brooklyn, N. Y,
Davis, George Jacob, Jr...........Hydr. and San. Engr., 20 Grant Bldg., Atlanta, Ga.

Foss, John Harrison..............Asst. Engr., Hamakua Ditch, Huelo, Maui, Hawaii.

Harshbarger, Elmer Dwight......520 Spring St., St. Louis, Mo.

Howes, Ralph Holt...............619 S. Warren St., Syracuse, N, Y.

Runyon, William Kerper..........Locating Engr., Canton-Hankow Ry. (Imperial Chinese Ry. Administration), Shanghai, China.

Sawyer, Wilbur Cyrus............Asst. Engr., U. S. Geological Survey, Washington, D. C.

Spencer, Louis Bernard...........Cons. Engr., Box 377, Salt Lake City, Utah.

Veuve, Erle Leroy................Asst. Engr., Pacific Elec. Ry. Co., 711 Kensington Rd., Los Angeles, Cal.

FELLOWS.

Darwin, Harry Gilbert...........Engr. in Chg. of San. Inspection, Hackensack Water Co., New Milford; Address, 84 Clinton Pl., Hackensack, N. J.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(February 9th to March 7th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(**1**) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(**2**) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(**3**) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(**4**) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(**5**) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(**6**) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(**7**) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(**8**) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(**9**) *Engineering Magazine*, New York City, 25c.
(**10**) *Cassier's Magazine*, New York City, 25c.
(**11**) *Engineering* (London), W. H. Wiley, New York City, 25c.
(**12**) *The Engineer* (London), International News Co., New York City, 35c.
(**13**) *Engineering News*, New York City, 15c.
(**14**) *The Engineering Record*, New York City, 12c.
(**15**) *Railroad Gazette*, New York City, 10c.
(**16**) *Engineering and Mining Journal*, New York City, 15c.
(**17**) *Street Railway Journal*, New York City, 35c.
(**18**) *Railway and Engineering Review*, Chicago, Ill., 10c.
(**19**) *Scientific American Supplement*, New York City, 10c.
(**20**) *Iron Age*, New York City, 10c.
(**21**) *Railway Engineer*, London, England, 25c.
(**22**) *Iron and Coal Trades Review*, London, England, 25c.
(**23**) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(**24**) *American Gas Light Journal*, New York City, 10c.
(**25**) *American Engineer*, New York City, 20c.
(**26**) *Electrical Review*, London, England.
(**27**) *Electrical World and Engineer*, New York City, 10c.
(**28**) *Journal*, New England Water-Works Assoc., Boston, $1.
(**29**) *Journal*, Society of Arts, London, England, 15c.
(**30**) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(**31**) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(**32**) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(**33**) *Le Génie Civil*, Paris, France.
(**34**) *Portefeuille Économique des Machines*, Paris, France.
(**35**) *Nouvelles Annales de la Construction*, Paris, France.
(**36**) *La Revue Technique*, Paris, France.
(**37**) *Revue de Mécanique*, Paris, France.
(**38**) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(**39**) *Railway Master Mechanic*, Chicago, Ill., 10c.
(**40**) *Railway Age*, Chicago, Ill., 10c.
(**41**) *Modern Machinery*, Chicago, Ill., 10c.
(**42**) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(**43**) *Annales des Ponts et Chaussées*, Paris, France.
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McCord Journal Box.* (**39**) Feb.
The Essentials of a Modern Railway Paint Shop. W. O. Quest. (**39**) Serial beginning Feb.
New Shops for the C., R. I. & P. Ry. at East Moline, Ill.* (**18**) Feb. 6.
50-ft. Steel Flat Car, Central R. R. of N. J.* (**18**) Feb. 6.
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Automatic Railway Signalling. (**12**) Serial beginning Feb. 12.
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A Powerful Automobile Train.* (**40**) Feb. 12.
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The Peters Block Signals, C., C. & L. R. R.* (**18**) Feb. 13.
New York Central Pacific Type Locomotives.* (**18**) Feb. 13.
The Pennsylvania R. R. Exhibit at the Louisiana Purchase Exposition. (**18**) Feb. 13.
Locomotive Proportion.* F. K. Caswell. (**18**) Feb. 13.
The Relief Valve as a Detriment to the Successful Operation of a Locomotive. G. W. Mudd. (Abstract of Paper read before the St. Louis Ry. Club.) (**18**) Feb. 13.
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Two Locomotive Experiments. Charles Rous-Marten. (**12**) Feb. 19.
Steel Cars on the Caledonian Railway of Scotland.* (**15**) Feb. 19.
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Derailments of Tenders. David Van Alstyne. (Paper read before the Iowa Ry. Club.) (**18**) Feb. 20.
Maximum Economical Load for a Locomotive. Chas. T. Noyes. (Abstract of Paper read before the Pacific Coast Ry. Club.) (**18**) Serial beginning Feb. 20.
Construction Work on the Southern Indiana Railway.* (**13**) Feb. 25.
Uneconomical Use of Block Signals.* (**15**) Feb. 26.
Performance of Automatic Signals in Cold Weather. H. S. Balliet. (**15**) Feb 26.
"Square" Roundhouses.* (**15**) Feb. 26.
Air Plant at the Saint Louis Terminal Station.* (**40**) Feb. 26.
The East Moline Shops of the Rock Island.* (**40**) Feb. 26.
Method of Making Competitive Tests of Capacity, Power Consumption and Efficiency of Motor-Driven Compressors for Brake Service. Edward H. Dewson. (**17**) Feb. 27.
Pacific Type Engine, Union Pacific R. R.* (**18**) Feb. 27.
The Pacific Electric Railway Company's System.* (**17**) Serial beginning Feb. 27.
Specifications for Cast Iron Car Wheels. (**18**) Feb. 27.
Installation of Electro-Gas Signals on the North-Eastern Railway. (**18**) Feb. 27.
Comparative Tests of Brake Beams: Steel *vs.* Wooden Beams. (**25**) Mar.
Six Coupled Passenger Locomotives: 4–6–2 (Pacific) Type, N. Y. C. & H. R. R. R.* (**25**) Mar.

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* Illustrated.

Railroad—(Continued).

A Comparison of Circular and Rectangular Engine Houses. (13) Mar. 3.
The Influence of Railroads on Latin-American Stability. Edward P. North, M. Am. Soc. C. E. (15) Mar. 4.
Fuel Tests on the Furness Railroad, England. (15) Mar. 4.
New Cars for the Milwaukee Refrigerator Transit Company.* (15) Mar. 4.
The Improvements on the Big Four Line between Lawrenceburg Junction and Sunman.* (14) Mar. 5
The Construction of the Texas & Oklahoma Railroad.* Robert F. Powell. (14) Mar. 5.
The Grand Central Depot Yard Improvements, New York.* (14) Mar. 5.
Air Brake for Electric Railways.* (17) Mar. 5.
The Great Northern & City Railway.* (17) Mar. 5.
Terminals at the St. Louis Exposition.* (17) Mar. 5.
Electricity as a Substitute for Steam in Heavy Railroad Service. Arthur M. Waitt. (40) Mar. 4.
Block Signals. A. M. Schoyer. (Paper read before the Ry. Club of Pittsburg.) (40) Mar. 4; (18) Mar. 5.
Consolidation Locomotive for Southern Railway.* (40) Mar. 4.
Baldwin Atlantic Type Compound Locomotive, C. M. & St. P. Ry.* (18) Mar. 5.
The Relief Valve in Locomotive Operation. (18) Mar. 5.
Steam Economy in the Locomotive. J. B. Alfree. (Paper read before the St. Louis Ry. Club.) (18) Mar. 5.
European Electrically Operated Car Transporters.* Frank C. Perkins. (18) Mar. 5.
A New Type of Rail.* (19) Mar. 5.
Les Voitures Automotrices de Chemins de Fer à Vapeur et à Pétrole.* L. Turgan. (32) Nov.
Etude des Mouvements Secondaires sur les Véhicules en Marche.* M. Sabouret. (38) Feb.
Note sur les Essais Effectués en Service Courant et à l'Aide d'Indicateurs de Pression sur les Locomotives Compound à 2 Cylindres et à 6 Roues Accouplées de la Compagnie du Midi.* Marchis et Ménétrier. (38) Feb.
Tunnel Fondé sur Pieux à Vis de Pennsylvania and Long-Island Railroad.* (33) Feb. 6.
Ascenseurs du Central London Railway: Ascenseurs Hydrauliques de la Station de Shepherd's Bush. (33) Feb. 20.

Railroad, Street.

Notes on the Construction of an Electric Road and Power-House at Morgantown, West Virginia.* Walter Loring Webb. (2) Jan.
Development of the Brill System of Trucks for Electric Motor Cars.* Wm. H. Heulings, Jr. (2) Jan.
"Tangential" Traction.* (73) Jan. 29.
A Tramways Telephone System.* (73) Jan. 29.
Conduit Permanent Way for Tramways.* (21) Feb.
Steam Cars for Public Service.* Thomas Clarkson, M. I. Mech. E. (29) Feb. 5.
A Single-Phase Electro-Pneumatic Railway System.* Bion J. Arnold. (73) Feb. 5.
The Electrification of the Metropolitan Railway.* (12) Serial beginning Feb. 12.
The Street Railway System of Schaffhausen, Switzerland.* (17) Feb. 13.
Steel Car for the New York Subway.* (17) Feb. 13.
New Surface Contact System.* (17) Feb. 13.
Interborough Rapid Transit All-Steel Cars.* (40) Feb. 19.
Manchester Street Power Station of the Rhode Island Company, Providence.* (14) Serial beginning Feb. 20.
Westinghouse No. 91 Single-Phase Railway Motor.* (17) Feb. 20.
Railway Power Plant at Providence, R. I.* (17) Feb. 20.
An Experimental Electric Railroad.* (19) Feb. 20.
The Lamme Single-Phase Railway Motor.* (27) Feb. 20.
Manchester Corporation Tramways: The Permanent Way, Overhead Equipment and Rolling Stock. J. M. McElroy. (Abstract of Paper read before the Inst. of Elec. Engrs.) (26) Feb. 26.
The Barking-Becton Light Railway.* (73) Feb. 26.
Special Pneumatic Lock for the Harlem River Tunnel.* (14) Feb. 27.
The Alternating Railway Motor Situation. Louis Bell. (17) Feb. 27.
Rail Joints and Their Relation to Pavements. C. R. Van Buskirk. (Paper read before the Brooklyn Engineers' Club.) (17) Feb. 27.
Efficiency Test of 1 250 Kilowatt Steam Turbine for Interborough Rapid Transit Company, New York City.* A. M. Mattice. (64) Mar.
Fireproof Cars for New York Subway.* (25) Mar.; (15) Feb. 12.
A Proposed Solution of the Brooklyn Bridge Terminal Problem.* S. S. Neff. (13) Mar. 3.
Erection of the Westchester Elevated Railway.* (14) Mar. 5.
Section Five A, Second Division, New York Rapid Transit Railroad.* (14) Mar. 5.
The New York and Brooklyn Tunnel for the Rapid Transit Railroad.* (14) Serial beginning Mar. 5.
Pneumatic Station Indicator for Subway and Elevated Systems.* (17) Mar. 5.
New Cars for Detroit.* (17) Mar. 5.

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* Illustrated.

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The Manx Electric Railway.* (17) Mar. 5.
The Tramway System of Bath, England.* (17) Mar. 5.
The Fused Steel-Tired Wheel.* Knox Taylor. (17) Mar. 5.
Cast-Welded Joints. Albert B. Herrick. (17) Mar. 5.
Automatic Railway Switch.* (17) Mar. 5.
The First Commercial Electric Street Railway in America.* (27) Mar. 5.
Past, Present and Future of Electric Traction. Frank J. Sprague. (27) Mar. 5.
The Ward Leonard Single-Phase Locomotive.* G. T. Hanchett. (27) Mar. 5.
Great Northern & City Railway, London, England.* (27) Mar. 5; (73) Jan. 29.
Appareil de Sécurité "Schulz" pour Tramways Électriques à Trolley avec Fil Protecteur.* (36) Feb. 10.

Sanitary.

The Sanitation and Proposed Sewerage System of Havana, Cuba. A. E. Carter, Assoc. M. Am. Soc. C. E. (6) Nov.
The Allegheny River; A Bacteriological Problem. W. H. Ingram. (58) Dec.
Sewage Testing Apparatus.* (12) Feb. 12.
Some Recent Small Sewage Purification Plants.* W. S. Shields. (Abstract of Paper read before the Indiana Eng. Soc.) (14) Feb. 13.
A Novel Center and Form for Concrete Sewer Work.* (13) Feb. 18.
Typhoid Fever History and the Water Supply of Pittsburg, Allegheny and Vicinity.* (13) Feb 25.
Extension of the London Main Drainage System. (12) Feb. 26.
A Small Wood-Stave Outfall Sewer at New London.* (14) Feb. 27.
The Sewage Purification Plant at the Eastern Hospital for the Insane.* R. L. Sackett. (Abstract of Paper read before the Indiana Eng. Soc.) (60) Mar.
An Epidemic of Typhoid Fever in East Minneapolis. Frederic H. Bass. (13) Mar. 3.
Construction of a Joint Trunk Sewer System in the Valleys of the Rahway and Elizabeth Rivers, New Jersey.* (14) Mar. 5.

Structural.

The Siegwart Ferro-Concrete Floor Beams.* (11) Jan. 29.
The Record of the Fire-Proof Building in the Baltimore Conflagration.* (13) Feb. 18.
Concerning the Failures of Reinforced Concrete.* (13) Feb. 18.
Detailed Studies of Fireproof Buildings in the Baltimore Conflagration.* (13) Feb. 25.
Steel Structures in the Baltimore Fire.* (20) Feb. 25; (14) Feb. 20.
The Cost of Raw Materials in Cement Manufacture. Morris M. Green. (62) Feb. 25.
Details of the Large Timber Roof of a Public Shelter in Van Cortlandt Park, New York.* (14) Feb. 27.
A Central Heating, Lighting and Ice-Making Station, Gulfport, Miss.* (14) Feb. 27.
Concrete Masonry with Special Reference to the Use of Natural Bank Gravel. George S. Pierson, M. Am. Soc. C. E. (Abstract of Paper read before the Mich. Eng. Soc.) (60) Mar.
Concrete. S. B. Newberry. (Abstract of Paper read before the Indiana Eng. Soc.) (60) Mar.
The "Slot System" of Attaching Shaft Hangers and Fixtures to Concrete-Steel Structures.* Henry Parsons Jones. (13) Mar. 3.
Caisson Foundations for a Large Steel-Cage Office Building on Broadway, New York.* (14) Mar. 5.
Concrete Plant for the New Union Depot, Washington.* (14) Mar. 5.
Difficulties and Methods of Plastering in Winter. D. L. Haigh. (14) Mar. 5.
Works of the Smith Premier Typewriter Company, Syracuse.* (14) Serial beginning Mar. 5.
The Erection of the Wall Street Exchange Building, New York.* (14) Mar. 5.

Topographical.

Massachusetts Institute of Technology Tape Apparatus. (14) Feb. 27.

Water Supply.

Turbine Flow-Recorder.* C. M. Allen, Jun. Am. Soc. M. E. (55) Vol. 24.
An Analysis of the "Commercial" Value of Water-Power per Horse-Power per Annum. A. F. Nagle, M. Am. Soc. M. E. (55) Vol. 24.
Water Softening.* James O. Handy. (58) Dec.
Illustrated Description of Some Filter Plants and Results.* Morris Knowles. (58) Dec.
Open or Covered Filters? Frans Engstrom. (58) Dec.
The Allegheny River; A Bacteriological Problem. W. H. Ingram. (58) Dec.
An American Hydro Electric Power Plant.* (12) Jan. 29.
New Type of Purifying Plant: Industrial Water Company.* (15) Feb. 12.
New Design of Water Softener.* (40) Feb. 12.
Power Development of the Toronto & Niagara Power Company.* (14) Feb. 13.
A New Water Power Development at New Milford, Connecticut.* Walter Scott Morton. (14) Serial beginning Feb. 13.
High-Pressure Power on the Housatonic.* (27) Feb. 13.

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* Illustrated.

Water Supply—(Continued).

The Proposed Tunnel for Water Development for Santa Barbara, Cal. (13) Feb. 18.
The Bradford Feed Pump.* (11) Feb. 19.
Description and History of the Water-Works and the American System of Filtration at Trieste, Austria.* E. A. Gieseler. (14) Feb. 20.
Water Softening Plants for the C., R. I. & P. Ry.* (18) Feb. 20.
Typhoid Fever History and the Water Supply at Pittsburg, Allegheny and Vicinity.* (13) Feb. 25.
A Rapid Filter Plant for the New Chester Water Company.* (14) Feb. 27.
A Concrete and Steel Covered Reservoir for Hoylake and West Kirby Water Works, England. (14) Feb. 27.
Water Purifying Plant.* (18) Feb. 27.
A Large Installation of Water-Softening Apparatus for the Rock Island.* (25) Mar.
A Proposed High Pressure Water Supply System for Fire Protection in Chicago.* (13) Mar. 3.
An Epidemic of Typhoid Fever in East Minneapolis, Frederic H. Bass. (13) Mar. 3.
Dredging at Loch Raven, Baltimore.* Alfred M. Quick. (14) Mar. 5.
Progress on the Wachusett Dam of the Metropolitan Water-Works , Massachusetts.* (14) Mar. 5.
A Concrete-Steel-Construction Filtration Plant for the New Haven Water Company.* (14) Serial beginning Mar. 5.
The Philadelphia Gas Engine Pumping Station for Fire Service.* (14) Mar. 5.
Théorie Générale du Mouvement Varié de l'Eau dans les Tuyaux de Conduite. E. Allievi. (37) Serial beginning Jan. 31.
Hydrologie de la Roche Calcaire des Environs de Tournai.* Ch. François. (30) Feb.

Waterways.

The New Off-Shore Floating Dock for the Reiherstieg Schiffswerfte und Maschinenfabrik, Hamburg.* (11) Feb. 12.
Quay Wall at Delfzijl.* (12) Feb. 19.
The Vicksburg Harbor and the Yazoo River Diversion Canal. Walter H. Polk. (14) Feb. 20.
Making the Southwest Pass of the Mississippi a Ship Channel.* (19) Feb. 20.
Pumping Machinery for the New Dock at Chatham.* (11) Feb. 26.
Electric Haulage on the Teltow Canal.* (17) Mar. 5.
Rapport de la Commission Néerlando-Belge Chargée de Visiter des Installations dans le Pays et à l'étranger en Vue de l'Outillage à Adopter pour la Manœuvre Mécanique Ouvrages à Construire a Terneuzen.* (30) Serial beginning Feb.

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* Illustrated.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 4.

APRIL, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that
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of presentation to the Society, are given.

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Papers and Discussions...........Pages 349 to 442.

NEW YORK 1904.

Entered according to Act of Congress, by the American Society of Civil Engineers
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American Society of Civil Engineers.

OFFICERS FOR 1904.

President, CHARLES HERMANY.

Vice-Presidents.

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JAMES D. SCHUYLER.	S. L. F. DEYO.

Secretary, CHARLES WARREN HUNT.

Treasurer, JOSEPH M. KNAP.

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Term expires January, 1905:	*Term expires January, 1906:*	*Term expires January, 1907:*
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WILLIAM J. WILGUS,	GEORGE S. DAVISON,	JOHN W. ELLIS,
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The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays Fourth of July, Thanksgiving Day and Christmas Day.

House of the Society—220 West Fifty-seventh Street, New York.

Telephone Number, - - - -	533 Columbus.
Cable Address, - - - - -	"Ceas, New York."

Vol. XXX. APRIL, 1904. No. 4.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

April 6th, 1904.—The meeting was called to order at 8.40 P. M.; Alfred Craven, Director, in the chair; Chas. Warren Hunt, Secretary; and present, also, 132 members and 46 guests.

The minutes of the meetings of March 2d and 16th, 1904, were approved as printed in the *Proceedings* for March, 1904.

The paper for the evening, entitled "A Phenomenal Land Slide," by D. D. Clarke, M. Am. Soc. C. E., was read by title, and the Secretary presented a letter relating to the present condition of the work described, written by the author since the paper was published.

G. B. Francis, M. Am. Soc. C. E., gave a description of the recently constructed Lackawanna and Wyoming Valley, double-track, third-rail, electric railroad from Scranton to Wilkesbarre, Pa., illustrated with lantern slides.

The Secretary announced that a contract had been signed for the purchase by the Society of the lot, 25 by 116 ft., to the west of the Society House.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Luther Elwood Gregory, Portsmouth, N. H.
George Terry Horton, Chicago, Ill.
Edgar S Nethercut, Chicago, Ill.
William Newbrough, Evanston, Wyo.
Stewart Kedzie Smith, Billings, Mont.
Gustav Adolph Tretter, Phœnixville, Pa.
Colin Reed Wise, Passaic, N. J.

As Associate Members.

Arthur Adams, Utica, N. Y.
Daniel Edwards Brinsmade, Derby, Conn.
Josiah William Buzzell, Boston, Mass.
Francis Albertson Cokefair, Duluth, Minn.
William Robert Dunn, Easton, Pa.
Frank Lewis Fales, Cincinnati, Ohio.
William Otto Galbreath, San José, Tamaulipas, Mexico.
Ernest Rotteck Gayler, New London, Conn.
Fred May Green, New York City.
Theodore Julius Klossowski, Ottawa, Ont., Canada.
Burton Rutherford Leffler, Cleveland, Ohio.
Luther Hammond Lewis, New York City.
Thomas Eugene Leard Lipsey, Beaver, Pa.
William Seeley Logan, Arlington, N. J.
William Smith Morison, Pennsgrove, N. J.
Clarence Hicks Nichols, New York City.
Clarence Webster Raynor, Kansas City, Mo.
DeWitt Lee Reaburn, Washington, D. C.
Lloyd Bown Smith, Arkansas City, Ark.
Herbert Joseph Wild, Meriden, Conn.
Walter Scott Williams, Columbia, Mo.
Winthrop Barrett Wood, Providence, R. I.

AS ASSOCIATE.

ALCIDE CHAUSSÉ, Montreal, Que., Canada.

The Secretary announced the transfer of the following candidates, by the Board of Direction, on April 5th, 1904, from the grade of Associate Member to the grade of Member:

AS MEMBERS.

RALPH HAMILTON CHAMBERS, New York City.
JAMES RUTHERFORD ELLIOTT, Pittsburg, Pa.
WALTER JOSEPH FRANCIS, Peterborough, Ont., Canada.
JULIUS HERMAN GEORGE WOLF, San Francisco, Cal.

The Secretary announced the election of the following candidates, by the Board of Direction, on April 5th, 1904:

AS JUNIORS.

ARTHUR HENRY BIRKS, Phœnixville, Pa.
LORENZO DANA CORNISH, Beaver, Pa.
FREDERICK VAN ZANDT LANE, Mt. Vernon, N. Y.
JUSTIN WYMAN LUDLOW, Chicago, Ill.
ALFRED WHEELER ROBERTS, Jersey City, N. J.
HARRY ASHTON ROBERTS, Hoboken, N. J.
GEORGE LOOMIS ROBINSON, New York City.
OSWALD PROCTER SHELLEY, Cornwall, Cal.

Adjourned.

April 20th, 1904.—The meeting was called to order at 8.50 P. M., George H. Pegram, Director, in the chair; T. J. McMinn, Assistant Secretary, acting as Secretary; and present, also, 120 members and 27 guests.

A paper, entitled "Lateral Earth Pressure and Related Phenomena," by E. P. Goodrich, Jun. Am. Soc. C. E., was presented by the author. A communication on the subject from M. F. Bonzano, M. Am. Soc. C. E., was presented by the Acting Secretary, and the paper was discussed by Messrs. R. B. Stanton, Richard Lyman, Virgil H. Hewes, H. F. Dunham and the author.

The Acting Secretary announced the death of the following members:

HENRY LOUIS MARINDIN, elected Member May 7th, 1884; died March 25th, 1904.

B. FRANK RICHARDSON, elected Member July 1st, 1885; died April 18th, 1904.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

April 5th, 1904.—8.40 P. M.—President Hermany in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Buck, Craven, Croes, Curtis, Davison, Deyo, Ellis, Gowen, Jackson, Knap, E. C. Lewis, N. P. Lewis, Modjeski, Noble, Osgood, Pegram, Webster, and Wilgus.

Resolutions were adopted authorizing the purchase of a lot, 25 ft. front, with an average depth of 116 ft., immediately adjoining the present Society House.

The Secretary was authorized to open and count the ballots on the proposed Committee on "Concrete and Steel-Concrete," and to report the result to the next meeting of the Board.

Applications were considered and other routine business transacted.

Four Associate Members were transferred to the grade of Member, and eight candidates for Junior were elected.*

Adjourned.

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* See page 167.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, May 4th, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "The Lake Cheesman Dam and Reservoir," by Charles L. Harrison, M. Am. Soc. C. E., and Silas H. Woodard, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper was printed in *Proceedings* for March, 1904.

Wednesday, May 18th, 1904.—8.30 P. M.—At this meeting two papers will be presented for discussion, as follows: "The Gatun Dam," by C. D. Ward, M. Am. Soc. C. E.; and "The Collapse of a Building During Construction," by H. de B. Parsons, M. Am. Soc. C. E.

Both these papers are printed in this number of *Proceedings.*

Wednesday, June 1st, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, "On Sedimentation," by Allen Hazen, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

Robert Moore, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
James L. Frazier, " " Frankfort, Ind.
William Jackson, " " Boston, Mass.
Emil Kuichling, " " New York, N. Y.
J. L. Van Ornum, " " St. Louis, Mo.
John F. Wallace, " " Chicago, Ill.
O. E. Mogensen, *Sec'ty,* " " St. Louis, Mo.

INTERNATIONAL ENGINEERING CONGRESS.

The following list gives the names of engineers who, by special invitation of the Committee in Charge, have promised to review the development of engineering practice in their respective countries during the past ten years.

HARBORS.—*Subject No. 1:*

W. Matthews, C. M. G., M. Inst. C. E., Chief Engr. of Dover Harbor, England.
V. E. Timonoff, M. Am. Soc. C. E., St. Petersburg, Russia.

On The Great Lakes.

Dan C. Kingman, Maj., Corps of Engrs., U. S. A.
D. D. Gaillard, Capt., Corps of Engrs., U. S. A.

On The Sea Coast.

Cassius E. Gillette, Capt., Corps of Engrs., U. S. A.
Charles H. McKinstry, M. Am. Soc. C. E., Capt., Corps of Engrs., U. S. A.

NATURAL WATERWAYS.—*Subject No. 2:*

James L. Lusk, M. Am. Soc. C. E., Maj., Corps of Engrs., U. S. A.
K. E. Hilgard, M. Am. Soc. C. E., Zurich, Switzerland.

ARTIFICIAL WATERWAYS.—*Subject No. 3:*

W. L. Sibert, M. Am. Soc. C. E., Capt., Corps of Engrs., U. S. A.
W. H. Hunter, M. Inst. C. E., Chief Engr., Manchester Ship Canal, England.

LIGHTHOUSES AND OTHER AIDS TO NAVIGATION.—*Subject No. 4:*

The United States Lighthouse Board.
Thomas Matthews, M. Inst. C. E., Chief Engr., Trinity House, London, England.

TRAFFIC ON IMPROVED WATERWAYS, ETC.—*Subject No. 5:*

Edward P. North, M. Am. Soc. C. E., New York City.

PURIFICATION OF WATER.—*Subject No. 6:*

a. For Domestic Use.

Allen Hazen, M. Am. Soc. C. E., New York City.

b. For the Production of Steam.

James O. Handy, Chief Chemist, Pittsburg Testing Laboratory, Pittsburg, Pa.

TURBINES AND WATER WHEELS.—*Subject No. 7:*

Gardner S. Williams, M. Am. Soc. C. E., Ithaca, N. Y.
John C. Temple, M. Am. Soc. C. E., Philadelphia, Pa.

IRRIGATION.—*Subject No. 8:*

Elwood Mead, M. Am. Soc. C. E., Chief, Irrigation Investigations, Washington, D. C.
Sir Hanbury Brown, K. C. M. G., M. Inst. C. E., Late Chief Inspector of Irrigation, Lower Egypt.

RAILROAD TERMINALS.—*Subject No. 9:*

Elmer L. Corthell, M. Am. Soc. C. E., New York City.

UNDERGROUND RAILWAYS.—*Subject No. 10:*

William Barclay Parsons, M. Am. Soc. C. E., Chief Engr., Rapid Transit Comm., New York City.
Basil Mott, M. Inst. C. E., and David Hay, M. Inst. C. E., Central London and City and South London Railways, England.

LOCOMOTIVES AND OTHER ROLLING STOCK.—*Subject No. 11:*

William Forsyth, M. Am. Soc. M. E., Chicago, Ill.
G. J. Churchward, M. Inst. C. E., Chief Locomotive Supt., Great Western Ry., England.

LIVE LOADS FOR RAILROAD BRIDGES.—*Subject No. 12:*

Henry W. Hodge, M. Am. Soc. C. E., New York City.

THE SUBSTITUTION OF ELECTRICITY FOR STEAM AS A MOTIVE POWER.—*Subject No. 13:*

James G. White, M. Am. Soc. C. E., New York City.
Alexander Siemens, M. Inst. C. E., London, England.

SEWAGE DISPOSAL.—*Subject No. 14:*

George W. Fuller, Assoc. M. Am. Soc. C. E., New York City.

DISPOSAL OF MUNICIPAL REFUSE.—*Subject No. 15:*

Rudolph Hering, M. Am. Soc. C. E., New York City.

VENTILATION OF TUNNELS.—*Subject No. 16:*

Charles S. Churchill, M. Am. Soc. C. E., Chief Engr., Norfolk & Western R. R., Roanoke, Va.
Francis Fox, M. Inst. C. E., London, England.

HIGHWAY CONSTRUCTION.—*Subject No. 17:*

James Owen, M. Am. Soc. C. E., Newark, N. J.
William E. McClintock, M. Am. Soc. C. E., Chairman, Massachusetts Highway Comm., Boston, Mass.

CONCRETE AND CONCRETE-STEEL.—*Subject No. 18:*

Edwin Thacher, M. Am. Soc. C. E., New York City.
John S. Sewell, Capt., Corps of Engrs., U. S. A.

DEEP FOUNDATIONS.—*Subject No. 19:*

John F. O'Rourke, M. Am. Soc. C. E., New York City.

THE MANUFACTURE OF STEEL.—*Subject No. 20:*

William Metcalf, Past-Pres., Am. Soc. C. E., Pittsburg, Pa.

TESTS OF MATERIALS OF CONSTRUCTION.—*Subject No. 21:*

Steel.

William R. Webster, M. Am. Soc. C. E., Philadelphia, Pa.

Timber.

Gaetano Lanza, M. Am. Soc. M. E., Boston, Mass.

Cement.

William A. Aiken, M. Am. Soc. C. E., Pittsburg, Pa.

PASSENGER ELEVATORS.—*Subject No. 22:*

Thomas E. Brown, M. Am. Soc. C. E., New York City.

PUMPING MACHINERY.—*Subject No. 23:*

Irving H. Reynolds, M. Am. Soc. M. E., Youngstown, Ohio.
William Mayo Venable, Assoc. M. Am. Soc. C. E., New Orleans, La.

DREDGES: THEIR CONSTRUCTION AND PERFORMANCE.—*Subject No. 24:*

A. W. Robinson, M. Am. Soc. C. E., Montreal, Canada.
F. B. Maltby, M. Am. Soc. C. E., Memphis, Tenn.
J. C. Sanford, Maj., Corps of Engrs., U. S. A.

STEAM TURBINES.—*Subject No. 25:*

Francis Hodgkinson, M. Am. Soc. M. E., Pittsburg, Pa.

ELECTRICAL POWER—GENERATING STATIONS AND TRANSMISSION.—*Subject No. 26:*

L. B. Stillwell, M. Am. Soc. C. E., New York City.

NAVAL ARCHITECTURE.—*Subject No. 27:*

W. L. Capps, Rear Admiral, Chief Constructor, U. S. N.
Sir William H. White, K. C. B., F. R. S., President, Inst. C. E., late Director of Naval Construction, England.

MARINE ENGINEERING.—*Subject No. 28:*

W. F. Durand, M. Am. Soc. M. E., Ithaca, N. Y.

DRY DOCKS.—*Subject No. 29:*

M. T. Endicott, M. Am. Soc. C. E., Rear Admiral, Chief of Bureau of Yards and Docks, U. S. N.
Cuthbert A. Brereton, M. Inst. C. E., England.

ORDNANCE.—*Subject No. 30:*

Thales L. Ames, Capt., Ordnance Dept., U. S. A.
H. C. L. Holden, Lieut.-Col., R. A., F. R. S., Supt. of Royal Gun Factory, Woolwich, England.

FORTIFICATIONS.—*Subject No. 31:*

S. W. Roessler, Maj., Corps of Engrs., U. S. A.
George W. Goethals, Maj., Corps of Engrs., U. S. A.

MINING ENGINEERING.—*Subject No. 32:*

E. G. Spilsbury, M. Am. Soc. C. E., Trenton, N. J.

ENGINEERING EDUCATION.—*Subject No. 33:*

Robert Fletcher, Assoc. Am. Soc. C. E., Prof. of Civil Engineering, Dartmouth Coll., Hanover, N. H.
Calvin M. Woodward, Dean of Eng. School, Washington Univ., St. Louis, Mo.
W. Cawthorne Unwin, F. R. S., M. Inst. C. E., Cooper's Hill College and City and Guilds Technical College, London, England.

SURVEYING.—*Subject No. 35:*

HENRY M. WILSON, M. Am. Soc. C. E., Geographer, U. S. Geological Survey, Washington, D. C.
The United States Coast and Geodetic Survey.

WHARVES AND PIERS.—*Subject No. 37:*

JOHN A. BENSEL, M. Am. Soc. C. E., Engr. in Chief, Dept. of Docks and Ferries, New York City.

THE MANUFACTURE OF CEMENT.—*Subject No. 38:*

ROBERT W. LESLEY, Assoc. Am. Soc. C. E., Philadelphia, Pa.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The **Boston Society of Civil Engineers** will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of the **St. Louis Engineers' Club,** in the business center of St. Louis, will be kept open during the World's Fair season, May 1st to December 1st, 1904, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of the **Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August: REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, first Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

REPORT OF A COMMITTEE TO CO-OPERATE IN STANDARDIZING ABBREVIATIONS, SYMBOLS, PUNCTUATION, ETC., IN TECHNICAL PAPERS.

This Committee is the result of a desire of the authorities in charge of the publications of the four national engineering societies to co-operate in this matter.

The members of the Committee are the following:

Charles Warren Hunt, Secretary, American Society of Civil Engineers; D. S. Jacobus, Vice-President, American Society of Mechanical Engineers; Joseph Struthers, Assistant Editor, American Institute of Mining Engineers; Cary T. Hutchinson, Chairman, The Editing Committee, American Institute of Electrical Engineers.

This Committee has held several meetings; it seemed advisable, at the outset, to limit its discussions closely to the general subject of abbreviations. Further, it seemed best to formulate a few general rules to be followed in making abbreviations, rather than to compile a list of forms to be recommended.

The Committee decided to limit the subject more narrowly by considering only abbreviations to be used in the text, or general reading matter, and not those to be used in special matter, such as columns, box-headings, plates, figures, etc. The rules that follow are intended to apply to the text, and not primarily to such special matter. This Committee is of the opinion that it is impracticable to make general rules applicable to special matter; it believes that the rules herein stated should be followed as far as possible even in special matter, realizing, however, that clearness is of the first importance, and that all rules must be secondary to that consideration.

Referring, then, to abbreviations in the text or general reading matter, the Committee recommends the observance of the following rules:

1.—Use abbreviations only after nouns denoting a definite quantity. Example: "The power plant has a capacity of 10 h. p.," not "10 horse power;" but, "The capacity of the plant, in horse power, is ten."

2.—Do not abbreviate abstract or descriptive words. Example: "Horizontal return tubular boilers," not "h. r. t. boilers."

3.—Use lower-case characters for abbreviations. An exception to this rule may be made in the case of words spelled normally with a capital. Example: "B. t. u." and not "b. t. u.," nor "B. T. U." (British thermal unit). "U. S. gal." (United States gallon). "B. & S. gauge" (Brown and Sharpe gauge).

4.—Use a period after each abbreviation. In a compound abbreviation, do not use a space after the period. Example: "i.h.p.," and not "i. h. p." (indicated horse power).

5.—Use a hyphen to connect abbreviations in cases where the words would take a hyphen if written out in full. When a hyphen is used, omit the period immediately preceding the hyphen. Example: "3 kw-hr." and not "3 kw.-hr." (3 kilowatt-hours).

6.—Use all abbreviations in the singular. Example: "17 lb." and not "17 lbs." (17 pounds); "14 in.," and not "14 ins." (14 inches).

7.—Never use "p." for "per," but spell out the word. Example: "100 ft-lb. per ton" (100 foot-pounds per ton); "60 miles per hr." (60 miles per hour).

8.—Use decimals, as far as possible, in place of vulgar fractions. Example: "1.25 ft.," not "1¼ ft."

9.—In general, spell out an adjective qualifying the name of a unit. Example: "Boiler h.p." (boiler horse power). The exceptions to this rule are: "i.h.p." (indicated horse power), "e.h.p." (electric horse power), "b.h.p." (brake horse power), "e.m.f." (electromotive force), "m.m.f." (magnetomotive force).

10.—Use "Fig.," not "Figure." Example: "Fig. 3," and not "Figure 3."

11.—In all decimal numbers having no units, a cipher should be placed before the decimal point. Example: "0.32 lb.," not ".32 lb."

12.—In the notation of large numbers, use "en" spaces instead of commas. Example: "1 520 125," not "1,520,125."

13.—Use the word "by" instead of "x" in giving dimensions. Example: "8 by 12 in.," not "8 x 12 in."

14.—Never use the characters (′) or (″) to indicate either feet and inches, or minutes and seconds as periods of time.

The following forms are given as illustrations of these rules, and are recommended to be used:

Name.	*Abbreviation.*	*Name.*	*Abbreviation.*
Inches	in.	Minutes	min.
Feet	ft.	Hours	hr.
Yards	yd.	Linear	lin.
Miles	spell out.	Square	sq.
Pounds	lb.	Cubic	cu.
Grains	gr.	Per	spell out.
Tons	spell out.	Fahrenheit	fahr.
Gallons	gal.	Centigrade	cent.
Metres	m.	Per cent.	% or per cent.
Millimetres	mm.	Volts	spell out.
Centimetres	cm.	Ohms	spell out.
Kilometres	km.	Watts	spell out.
Kilogrammes	kg.	Kilowatts	kw.
Grammes	g.	Kilowatt-hours	kw-hr.
Milligrammes	mg.	Watt-hours	watt-hr.
Seconds	sec.	Amperes	spell out.

Name.	*Abbreviation.*
Kilogramme-metres	kg-m.
Metre-kilogrammes	m-kg.
Brake horse power	b.h.p.
Electric horse power	e.h.p.
Indicated horse power	i.h.p.
British thermal units	B.t.u.
Gramme-calories	g-cal.
Kilogramme-calories	kg-cal.
Magnetomotive force	m.m.f.
Electromotive force	e.m.f.
Revolutions per minute	rev. per min.
Circular mils	cir. mils.
Miles per hour per second	miles per hr. per sec.
Candle-power	c-p.
Watts per candle-power	watts per c-p.
Mean effective pressure	spell out.
High-pressure cylinder	spell out.
Diameter	spell out.

The members of this Committee have agreed to recommend the authorities in charge of the publications of the four national engineering societies, to follow the rules given herein, in their respective publications, as far as possible.

New York, March 11th, 1904.

Chas. Warren Hunt,
D. S. Jacobus,
Jos. Struthers,
Cary T. Hutchinson.

The Publication Committee of this Society has adopted the recommendation of the above report, and the rules given in it will be followed in its publications, as far as possible.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From March 9th to April 12th, 1904.

DONATIONS.*

THE THEORY AND PRACTICE OF MODERN FRAMED STRUCTURES.

Designed for the Use of Schools, and for Engineers in Professional Practice. By J. B. Johnson, M. Inst. C. E., M. Am. Soc. C. E., M. Am. Soc. M. E., C. W. Bryan and F. E. Turneaure. Eighth Edition, Partly Rewritten. Cloth, 11 x 8 ins., 9 + 561 pp., illus. New York, John Wiley & Sons, 1904. $10.00.

The preface states that in this edition a considerable part of the work has been entirely rewritten and many changes made in other parts to bring them into harmony with the best modern practice. In the theoretical part of the book, the chapters on truss analysis for uniform loads have been entirely rewritten. Several changes have been made in the chapter on wheel-load methods; the chapter on conventional loads has been rewritten, and that on lateral trusses is nearly new. In the second part, the chapter on the design of plate girders has been largely rewritten, and that on the design of a pin-connected railway bridge entirely so. As a basis of the new designs used in these chapters, the American Bridge Company's specifications of 1900 have been adopted as being suited for this purpose. They are given in full in an appendix. The book is divided into two parts: Part I. Theory of Framed Structures; Part II. Structural Design. There are three appendices and an index of nine pages.

STEAM BOILERS, THEIR THEORY AND DESIGN.

By H. de B. Parsons. M. Am. Soc. C. E., M. Am. Soc. M. E. Cloth, 9 x 6 ins., 12 + 375 pp., illus. Longmans, Green, and Co., New York, 1903. $4.00. (Donated by the Author.)

This book comprises a series of lectures delivered to the senior class of the Rensselaer Polytechnic Institute, Troy, N. Y., rewritten and divided into chapters. The only originality claimed by the author for the work is the effort to cover such points as in practical office work may be found perplexing. The Contents are: Physical Properties; Combustion; Fuels; Furnace Temperature and Efficiency of Boiler; Boilers and Steam Generators; Chimney Draft; Materials; BoilerDetails; Boiler Fittings; Mechanical Stokers; Artificial Draft; Incrustation; Corrosion; General Wear and Tear, Explosions; Chimney Design; Smoke Prevention; Testing, Boiler Coverings, Care of Boilers; Superheated Steam. There is an index of six pages.

THE LAY-OUT OF CORLISS VALVE GEARS.

By Sanford A. Moss, M. Am. Soc. M. E. Reprinted from *The American Machinist*, with Revisions and Additions. Cloth, 6 x 4 ins., 108 pp., illus. New York, D. Van Nostrand Company, 1903. 50 cents.

This volume is an attempt to treat the Corliss valve gear from a theoretical point of view. An endeavor is made to treat the "single eccentric" motion from a rational standpoint. A discussion is given of the theoretical principles underlying the kinematic design or "lay-out" as it is commonly called. This is followed by directions for making a lay-out on the drawing-board. Reference is also made to the Corliss valve motion with double wrist-plate and long-range cut-off. For the sake of completeness a preliminary account is given of the usual mechanism of a Corliss valve gear. Beyond this description nothing is given concerning the detailed construction of the various parts, the kinematic features only, rather than the constructive features, being considered. The Chapter headings are: Description of the Corliss Valve Gear Mechanism; Operation of Corliss Valve Gears; Fundamental Influence of the Angle of Advance; Relative Motions of Eccentric, Wrist Plate and Valves; Theory of the Corliss Wrist Plate; Valve Displacement Curves; Selection of the Arbitrary Dimensions of a Corliss Gear; Laying out the Single Wrist Plate Corliss Gear on the Drawing-Board.

TOWERS AND TANKS FOR WATER-WORKS.

The Theory and Practice of Their Design and Construction. By J. N. Hazlehurst, M. Am. Soc. C. E. Second Edition, Revised and Enlarged. Cloth, 9 x 6 ins., 10 + 324 pp., illus. New York, John Wiley & Sons, 1904. $2.50.

In this edition, eliminations have been made, and typographical and other errors have been corrected; the work throughout has been largely revised and rewritten, and many new illustrations have been added. The new matter includes a record of stand-pipe failures, continuing from the time of Prof. Pence's monograph to the present; a chapter dealing with the stresses in a steel water-tower, originally presented in the *Technograph*, and revised and rewritten by its author for this work; also two chapters upon the subject of specifications for and the architectural and ornamental possibility of water-tower design. The Contents are: Introduction; Historical; The Chemical and Physical Properties of Structural Metal; Structural Metals; Stress or Strain, and Stability of Structure; Mechanical Principles; The Stresses in a Steel Water-Tower; Riveting; Designing; Foundations; Painting; Shop Practice and Erection; Specifications; Architecture and Ornamentation. There is an index of five pages.

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* Unless otherwise specified, books in this list have been donated by the publishers.

ARCHITECTS' AND ENGINEERS' HAND-BOOK OF REINFORCED CONCRETE CONSTRUCTIONS.

Giving in Plain and Simple Language the Leading Principles and Applications of this Modern Construction. By L. J. Mensch. Paper, 7½ x 5 ins., 217 pp., illus. Chicago, Cement and Engineering News. $2.00.

The information in this hand-book is drawn largely from the writer's experience as designer, consulting engineer and contractor for reinforced concrete constructions. In the practice of his profession, in various parts of the country, the author has been brought into contact with architects, engineers and others interested in this method of construction. These clients have from time to time asked numerous questions relating to the essential features of reinforced concrete construction, especially as compared with other materials and forms of construction. These questions and the author's answers were uniformly reduced to writing and classified, and now form a portion of this handbook, together with other material bearing on the subject. The author has aimed to treat the subject in plain and simple language, free from higher mathematical calculations. There is an index of two pages.

RECHERCHES EXPERIMENTALES SUR LA CONSTITUTION DES MORTIERS HYDRAULIQUES.

Par H. Le Chatelier. Cloth, 10 x 6 ins., 4 + 199 pp., illus. Paris, Vve. Ch. Dunod, 1904. Broché, 6 francs; cartonné, 7 francs, 50.

The introduction states that the principal object of this work is the study of the chemical reactions produced in limes and hydraulic cements during their calcination and setting. The author has taken as a preliminary study the more simple analogous substances, lime and silicates of barytes, hoping that a knowledge of the elements of which these are composed will throw light on the theory of calcareous cements. The work is divided into three parts: Part I. Plâtre; Part II. Silicates de Baryte; Part III. Ciment et Chaux Hydrauliques.

THE ELECTROLYSIS OF WATER.

Processes and Applications. By Viktor Engelhardt. Authorized English Translation by Joseph W. Richards. Cloth, 9 x 6 ins., 10 + 140 pp., illus. Easton, Pa., Chemical Publishing Co., 1904. (Monographs on Applied Electrochemistry. Vol. I.)

In the collection of *Monographs of Applied Electrochemistry*, of which this is the first volume, it will be the object to set forth detailed and authentic reports in the field of applied electrochemistry. These monographs will be special reports, in which the entire historical development will be set forth, and a review of the most important patent literature made. A considerable proportion of the English-speaking electrochemists can read the German text, but a still larger proportion cannot, and that the latter class may have access to the thoughts and ideas of this monograph is the purpose of the translation. The Contents are: Historical Review; The Constants of the Electrolytic Decomposition of Water; Review of Processes—Processes and Apparatus for the Separate Production of Oxygen and Hydrogen; Processes and Apparatus for the Electrolysis of Water without Separation of the Gas, Processes for the Simple Evolution of Oxygen; Applications; Appendix. There is an index of two pages.

FACTS ABOUT PEAT, PEAT FUEL AND PEAT COKE.

How to Make It and How to Use It—What It Costs and What It Is Worth, with Brief Notes Concerning Its Use and Value for Numerous Other Purposes. By T. H. Leavitt. Cloth, 7½ x 5 ins., 115 pp. Boston, Lee and Shepard, 1904. $1.00 net.

A number of years ago the author operated works at Lexington, Massachusetts, for the manufacture of peat fuel, and for the perfecting of machinery for its production.

During that time he prepared a volume entitled "Facts About Peat," which is now out of print, the plates having been destroyed by fire. The present volume, therefore, under the same title, is prepared as a substitute for that, with a view to affording information of a practical character to those proposing to manufacture or use such fuel. The chapter headings are: What is Peat? Where Peat is Found; How to Make Peat Fuel; Peat Coke; Intensity of Heat Generated by Peat Fuel; Peat Fuel for Domestic Purposes; Peat as a Fuel for Generating Steam; Peat in the Manufacture of Iron and Steel; Other Uses of Peat Fuel; Peat for Gunpowder and Fireworks; Gas from Peat; Cost and Market Value of Peat Fuel; The Market for Peat Fuel; Chemical Products of Peat; Ashes of Peat; Conclusions; Antiseptic Properties of Peat; Peat as a Disinfectant and Deodorizing Agent; Other Uses for Peat; Peat as a Fertilizer; Peat Moss Litter; Mixed Fuels; Caution and Encouragement; What Shall We Do About it? Appendix.

RIVER TRAINING AND CONTROL.

Being a Description of the Theory and Practice of the Modern System Entitled the Guide Bank System, Used in India for the Control and Guidance of Great Alluvial Rivers. By Francis J. E. Spring, M. Inst. C. E., M. Inst. Mech. E., M. Am. Soc. C. E. Cloth, 14 x 9 ins., various paging, 50 plates. Simla, Government Central Printing Office, 1903. (Donated by the Author.)

The scheme of the book is as follows: After a brief introductory chapter, which attempts to give an idea of the importance of the subject, a comparison is made between the Mississippi and Indian rivers of the class chiefly dealt with. Chapters III, IV and V deal with river action. Chapter VI shows how different are the sands of different rivers in their susceptibility to water transportation. Chapters VII to X inclusive, explain the principles, as the author understands them, underlying the due design of the class of works which give this book its title. Chapter XII deals with riparian towns, etc., of the narrowing of soft bedded rivers, by means of guide banks at the abutments of bridges or weirs. The next ten chapters are devoted to a history of the training works of certain selected bridges and weirs. In these chapters the author has endeavored to show how the idea of the modern guide bank gradually grew out of a number of experiences, until it was formulated at last definitely. Chapters XXIII and XXV show how the author has designed the guide banks and depth of foundations for the projected Lower Ganges bridge. Chapter XXIV is devoted to such evidence on the subject as seems likely to be useful to bridge designers. Chapter XXVI sums up the evidence, and Chapter XXVII makes some suggestions. An appendix follows giving general information and a list of some literature on the subject.

MAVER'S WIRELESS TELEGRAPHY.

Theory and Practice. By William Maver, Jr., M. Am. Inst. E. E. Cloth, 9 x 6 ins., 6 + 199 pp., illus. New York, Maver Publishing Company, 1904. $2.00.

The preface states that in this work each subject has been treated both from a theoretical and a practical standpoint, in a language as free as possible from formulæ. and the whole has been written in a manner designed to be clear to the general reader. The descriptions of systems and apparatus, with a few exceptions, are limited to those in actual operation. It is believed, however, that the book will be found to contain much more than a mere account of the wireless systems at present in use. In fact, the aim has been to give a comprehensive statement of all that appertains to the art at this time, in the hope of supplying herein a complete practical handbook of wireless telegraphy. The contents are: Induction Telegraphy; Electric or Hertzian-Wave Telegraphy; Early Experiments in Electric-Wave Telegraphy; Theory of Electric-Wave Propagation; Syntonic Wireless Telegraphy; Marconi Wireless Telegraph Systems; Lodge and Lodge-Muirhead Wireless Telegraph Systems; The Slaby-Arco and Braun Wireless Telegraph Systems; The Branly-Popp, Guarini, and Ducretet-Poppoff Wireless Telegraph Systems; The De Forest Wireless Telegraph System; The Fessenden, Stone, Shoemaker, and Musso Systems; Signaling by Ultra Violet Rays; Wireless Telephony: Detectors, Interruptors, Transformers, etc.; Practical Applications of Wireless Telegraphy; Appendix. There is an index of six pages.

THE METRIC FALLACY.

By Frederick A. Halsey; and, The Metric Failure in the Textile Industry. By Samuel S. Dale. Cloth, 9 x 6 ins., 231 pp., illus. New York, D. Van Nostrand Company, 1904. $1.00.

This book is the outgrowth of a paper presented to the American Society of Mechanical Engineers at its December meeting, 1902, and the discussion which followed. The points raised in the discussion have been rewritten and placed in their appropriate places. The list of countries in which it was shown in the paper that old units continue in use has been about quadrupled, while new chapters have been added on "The

Reasons for the Failure of Compulsory Laws," "Scientific and Industrial Measurements." "Scientific and Industrial Difficulties." "The Complications Due to a Mixture of Units," "The Inaccuracy of the Meter." "The Abandoned Portions of the Metric System" and "The Object of the Bill." Part II, on The Metric Failure in the Textile Industry, has also been entirely rewritten. The table of Continental systems of numbering spun yarn has been compiled from the latest French, German and Spanish authorities; Care has been taken to eliminate all systems not in actual use. There is an appendix entitled Action of Various Associations on the Metric System Bill which was reported favorably to the Fifty-Seventh Congress.

Gifts have also been received from the following:

Am. Electro-Therapeutic Assoc. 1 pam.
Am. Inst. Min. Engrs. 1 pam.
Am. Soc. Mech. Engrs. 1 vol.
Am. St. Ry. Assoc. 21 vol.
Assoc. Amicale des Anciens Élèves de l'École Centrale des Arts et Manufactures. 8 nos.
Assoc. of Executive Health Officers of Ontario. 1 pam.
Bettinger, Albert. 1 pam.
Binghamton, N. Y.—Water Commrs. 1 pam.
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Der Drehstrommotor. Ein Handbuch für Studium und Praxis. Von Julius Heubach. Berlin, Julius Springer, 1904.

Messungen an Elektrischen Maschinen. Apparate, Instrumente, Methoden, Schaltungen. Von Rudolf Krause. Berlin, Julius Springer, 1903.

Der Elektrische Lichtbogen bei Gleichstrom und Wechselstrom und Seine Anwendungen. Von Berthold Monasch. Berlin, Julius Springer, 1904.

Naval Architecture. By Cecil H. Peabody. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1904.

Submarine Navigation, Past and Present. By Alan H. Burgoyne. 2 vol. New York, E. P. Dutton & Co.; London, Grant Richards, 1903.

Indicator Practice and Steam Engine Economy. With Plain Directions for Attaching the Indicator, Taking Diagrams, Computing the Horsepower, Drawing the Theoretical Curve, Calculating Steam Consumption, Determining Economy, Locating Derangement of Valves, and Making All Desired Deductions; also Tables Required in Making the Necessary Computations, and an Outline of Current Practice in Testing Steam-Engines and Boilers. By Frank Hemenway. Sixth Edition. New York, John Wiley & Sons; London, Chapman & Hall, Ltd., 1903.

Machine Design. Part I. Kinematics of Machinery. By Forrest R. Jones. Third Edition, Revised. New York, John Wiley & Sons, 1903.

Who's Who, 1904. An Annual Biographical Dictionary. London, Adam and Charles Black; New York, The Macmillan Company, 1904.

How to Lay Out a Garden: Intended as a General Guide in Choosing, Forming, or Improving an Estate, with Reference to Both Design and Execution. By Edward Kemp. Third Edition. New York, John Wiley & Sons, 1901.

The Civil Engineer's Pocket-Book. By John C. Trautwine. Revised by John C. Trautwine, Jr., and John C. Trautwine, 3d. Eighteenth Edition. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1904.

Cram's Standard American Railway System Atlas of the World, Showing all the Railway Systems in Colors, Accompanied by a Complete and Simple Index of the United States Showing the True Location of All Railroads, Towns, Villages and Post-Offices. New York and Chicago, George F. Cram, 1904.

The Elements of Mining and Quarrying. By Sir C. Le Neve Foster. London, Charles Griffin and Company, Limited; New York, The Engineering and Mining Journal, 1903.

Ore Deposits of the United States and Canada. By James Furman Kemp. Fifth Edition, Entirely Rewritten and Enlarged. The Engineering and Mining Journal, New York, London, 1903.

The Non-Metallic Minerals. Their Occurrence and Use. By George P. Merrill. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1904.

The Prospector's Field-Book and Guide in the Search for and the Easy Determination of Ores and Other Useful Minerals. By H. S. Osborn. Sixth Edition, thoroughly Revised and Enlarged. Philadelphia, Henry Carey Baird & Co., 1903.

Disinfection and the Preservation of Food, together with an Account of the Chemical Substances Used as Antiseptics and Preservatives. By Samuel Rideal. London, The Sanitary Publishing Co., Ltd.; New York, John Wiley and Sons, 1903.

Domestic Sanitary Drainage and Plumbing. Lectures on Practical Sanitation Delivered to Plumbers, Engineers, and Others in the Central Technical Institution, South Kensington, London, Under the Auspices of the City and Guilds of London Institute for the Advancement of Technical Education. By William R. Maguire. Third Edition, Revised and Brought up to Date. London, Kegan Paul, Trench, Trübner & Co., Ltd., 1901.

Elements of Bacteriology, with Special Reference to Sanitary Water Analysis. By Samuel Cate Prescott and Charles-Edward Amory Winslow. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1904.

Rustless Coatings: Corrosion and Electrolysis of Iron and Steel. By M. P. Wood, M. Am. Soc. M. E. New York, John Wiley & Sons; London, Chapman & Hall, Limited, 1904.

Handbuch der Baukunde. Eine systematische und vollständige Zusammenstellung der Resultate der Bauwissenschaften mit den zugehörigen Hilfswissenschaften. Veranstaltet von den Herausgebern der Deutschen Bauzeitung und des Deutschen Baukalenders. Vol. III, Pts. 1–4. Berlin, Ernst Toeche, 1890–95.

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(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
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(74) *Transactions*, Inst. of Min. and Metal., London, England.
(75) *Proceedings*, Inst. of Mech. Engrs., London, England.

LIST OF ARTICLES.

Bridge.

The Graphical Calculation of Flange Stresses in Girders and Trusses.* Oscar Sanne. (**4**) Feb.
Opening Bridge over Barking Creek * (**12**) Mar. 4.
Cantilever Bridge over the East River.* (**11**) Mar. 4.
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A Cantilever Plate-Girder Highway Bridge.* (**14**) Apr. 9.

Electrical.

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Terminals and Bushings for High-Pressure Transformers. Walter S. Moody. (**42**) Jan.
Overhead High-Tension Distributing Systems in Suburban Districts. George H. Lukes. (**42**) Jan.
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* Illustrated.

PROCEEDINGS

OF THE

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OF

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(INSTITUTED 1852.)

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PROCEEDINGS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

May 4th, 1904.—The meeting was called to order at 8.45 P. M.; Edward P. North, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 146 members and 25 guests.

The minutes of the meetings of April 6th and 20th, 1904, were approved as printed in the *Proceedings* for April, 1904.

A paper, entitled "The Lake Cheesman Dam and Reservoir," by Charles L. Harrison, M. Am. Soc. C. E., and Silas H. Woodard, Assoc. M. Am. Soc. C. E., was presented by Mr. Harrison, and illustrated with lantern slides.

The paper was discussed by Messrs. G. S. Williams, E. Sherman Gould, E. W. Harrison, Emil Kuichling, Edward Wegmann, J. Waldo Smith and Charles L. Harrison.

The Secretary announced the receipt of written discussions from Messrs. J. P. Frizell, Burr Bassell, F. B. Maltby, Frank C. Horn and Charles S. Gowen, but owing to lack of time these were not read.

Ballots for membership were canvassed, and the following candidates elected.

As Members.

Jeremiah Ahern, Washington, D. C.
Walton Irving Aims, New York City.
Charles Hopkins Cartlidge, Chicago, Ill.
Roderick Greene Collins, Jr., New York City.
Arthur Warren Dean, Concord, N. H.
Guy Carleton Emerson, Boston, Mass.
Halbert Powers Gillette, New York City.
Homer Hamlin, Los Angeles, Cal.
Joseph Gales Holcombe, Manila, Philippine Islands.
Charles Mattathias Jacobs, New York City.
William Henry Jones, Leavenworth, Kans.
Edward Marion Kenly, Austen, W. Va.
Walter Danville Lovell, Des Moines, Iowa.
Henry Vincent Macksey, Boston, Mass.
Robert Bradford Marshall, Sacramento, Cal.
George Nauman, Harrisburg, Pa.
Edwin Rufus Quinby, New York City.
Henry Linton Reber, St. Louis, Mo.
Everett Edward Stone, Springfield, Mass.
Joseph Thompson Stuart, Chester, Pa.
John Edward Swanker, Middlesbrough, England.
Benjamin Henry Taylor, Edgewood Park, Pa.
Joseph Franklin Witmer, Buffalo, N. Y.

As Associate Members.

Hugh Cossart Baker, Jr., New York City.
John Mansfield Belknap, San Juan, Porto Rico.
Charles Ferdinand Brenn, Roslyn, Wash.
William Laramy Butcher, Boston, Mass.
Roscoe Nathaniel Clark, Hartford, Conn.
John Baptiste Clermont, New York City.
James Lyford Davis, New York City.
Albert Emerson Greene, Ann Arbor, Mich.

John Clayton Hoyt, Washington, D. C.
Robert Hyde Jacobs, New York City.
William Bard Johnstone, New York City.
Oscar Francis Lackey, Santiago, Cuba
Charles Orton Lasley, Toledo, Ohio.
Robert Leathan Lund, Nashville, Tenn.
John Henry Madden, New York City.
Harry Hayes Robinson, Portland, Me.
James Forrest Sanborn, Brooklyn, N. Y.
Oscar James West, Chicago, Ill.
Wilkie Woodard, Shreveport, La.
Andrew Alfred Woods, Jr., Vicksburg, Miss.

As Associate.

Richard Roswell Lyman, Ithaca, N. Y.

The Secretary made the following announcements:

The transfer of the following candidates, by the Board of Direction, on May 3d, 1904:

From Associate Member to Member.

Richard Lewis Humphrey, Philadelphia, Pa.
John Cranch Moses, Cambridge, Mass.
Frank Herbert Snow, Boston, Mass.
Clement Isaac Walker, New York City.
Frederick Conover Warman, Washington, D. C.
Walter Loring Webb, Philadelphia, Pa.

From Associate to Associate Member.

Charles Henry Umstead, Lawrence, Mass.

The election of the following candidates, by the Board of Direction, on May 3d, 1904:

As Juniors.

Laurence Adams Ball, New York City.
Ralph Weller Greenlaw, New York City.
Albert Preston Greensfelder, St. Louis, Mo.
Edward Joseph Gugerty, New York City.
Gage Haselton, Boston, Mass.
Robert Hall Merrill, Grand Rapids, Mich.

The following deaths:

Danforth Hurlbut Ainsworth, elected Member, March 3d, 1886; died April 24th, 1904.

Charles Storer Storrow, elected Honorary Member, January 24th, 1893; died April 30th, 1904.

James W. Ainslie, elected Fellow, May 28th, 1872; died September 13th, 1902.

Adjourned.

May 18th, 1904.—The meeting was called to order at 8.45 p. m.; Past-President Alfred Noble in the chair; Chas. Warren Hunt, Secretary; and present, also, 156 members and 44 guests.

A paper, entitled "The Gatun Dam," by C. D. Ward, M. Am. Soc. C. E., was presented by the author and discussed by Charles L. Harrison, M. Am. Soc. C. E., and the author.

A second paper, entitled, "The Collapse of a Building During Construction," by H. de B. Parsons, M. Am. Soc. C. E., was presented by the author.

The Secretary presented written communications on the paper from Messrs. Guy B. Wait, Nathaniel Roberts and C. J. Tilden.

The subject was discussed further by Messrs. F. T. Llewellyn, J. P. Whiskeman, C. C. Schneider, O. Lowinson, H. P. Macdonald and J. H. O'Brien.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

May 3d, 1904.—8.30 P. M.—Vice-President Deyo in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Buck, Craven, Croes, Ellis, Gowen, Knap, Noble, Osgood, Webster and Wilgus.

Ballots on the matter of the appointment of a Special Committee on "Concrete and Steel-Concrete" were canvassed, with the following result:

In favor of the appointment of the Committee	911
Against the appointment of the Committee	36
Total	947

The Special Committee was appointed.

Action was taken in regard to members in arrears for dues.

The following Committee was appointed to recommend the award of prizes for the year ending with the publications of July, 1904:

Charles L. Strobel,
Samuel Tobias Wagner,
J. L. Ludlow.

Plans for the enlargement of the Society House were considered.

Applications were considered and other routine business transacted. Six Associate Members were transferred to the grade of Member; one Associate was transferred to the grade of Associate Member, and six candidates for Junior were elected.*

Adjourned.

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* See page 213.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, June 1st, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, "On Sedimentation," by Allen Hazen, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings*.

Wednesday, September 7th, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "The Installation of a Pneumatic Pumping Plant," by Arthur H. Diamant, Jun. Am. Soc. C. E., and "Some Notes on the Creeping of Rails," by Samuel Tobias Wagner, M. Am. Soc. C. E.

Both these papers are printed in this number of *Proceedings*.

ANNUAL CONVENTION, 1904.

The Thirty-sixth Annual Convention will be held at St. Louis, Mo., during the week beginning October 3d, 1904.

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers **in the center of the Liberal Arts Building,** and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

ROBERT MOORE, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
EDWARD C. CARTER, M. Am. Soc. C. E., Chicago, Ill.
MORDECAI T. ENDICOTT, M. Am. Soc. C. E., Washington, D. C.
JAMES L. FRAZIER, " " Frankfort, Ind.
WILLIAM JACKSON, " " Boston, Mass.
EMIL KUICHLING, " " New York, N. Y.
J. L. VAN ORNUM, " " St. Louis, Mo.
JOHN F. WALLACE, " " Chicago, Ill.
O. E. MOGENSEN, *Sec'ty,* " " St. Louis, Mo.

COMMITTEE OF ARRANGEMENTS FOR THE ENTERTAINMENT OF MEMBERS OF THE INSTITUTION OF CIVIL ENGINEERS, IN SEPTEMBER, 1904.

The following committee has been appointed by the Board of Direction to arrange for the reception and entertainment of the members of the Institution of Civil Engineers, who will visit the Society Headquarters in September, 1904:

Charles Hermany, *Chairman.*
Charles Paine,
D. J. Whittemore,
Thomas C. Keefer,
Octave Chanute,
Mendes Cohen,
William Metcalf,
William P. Craighill,
Benjamin M. Harrod,
Desmond FitzGerald,
John F. Wallace,
J. James R. Croes,
Robert Moore,
J. A. Bensel,
A. P. Boller,
R. S. Buck,
C. W. Buchholz,
Theodore Cooper,
Foster Crowell,
S. L. F. Deyo,
G. J. Fiebeger,
G. S. Greene, Jr.,
C. E. Grunsky,
Alfred Noble, *Vice-Chairman.*
Allen Hazen,
Rudolph Hering,
Clemens Herschel,
Alex. C. Humphreys,
L. M. Johnson,
J. J. Kennedy,
Nelson P. Lewis,
Chas. Macdonald,
Edward P. North,
E. E. Olcott,
Wm. Barclay Parsons,
Geo. H. Pegram,
Samuel Rea,
Jos. Ramsey, Jr.,
J. V. W. Reynders,
A. A. Robinson,
W. L. Saunders,
C. C. Schneider,
J. Waldo Smith,
Wm. H. Wiley,
W. J. Wilgus,
Chas. Warren Hunt, *Secretary.*

As soon as details have been perfected, a circular of information will be issued to the membership.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The **Boston Society of Civil Engineers** will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of the **St. Louis Engineers' Club**, in the business center of St. Louis, will be kept open during the World's Fair season, May 1st to December 1st, 1904, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of the **Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, first Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From April 13th to May 10th, 1904.

DONATIONS.*

TABLES SHOWING LOSS OF HEAD DUE TO FRICTION OF WATER IN PIPES.

By Edmund B. Weston, M. Am. Soc. C. E., M. Inst. C. E. Third Edition. Leather, 6 x 4 ins., 5 + 170 pp. New York, D. Van Nostrand Company, 1903. $1.50. (Donated by the author.)

The author states in the preface that, when he first began to make a practical application of hydraulic formulas, he was unable to find one for calculating the loss of head due to the friction of water flowing in pipes, that he had not heard criticised more or less unfavorably. This led him to commence to make special investigations upon the subject. The data of five hundred and twenty experiments, which had been made by twenty-six different investigators, were obtained. A study of these experimental data convinced him that the same formula would not apply to all cases, and that in order to make an intelligent investigation, it would be necessary to divide the data into three classes, viz., those which had been obtained with pipes having very smooth interior sides similar to lead and brass pipes, those with pipes having interior sides similar to new cast-iron pipes, those with pipes having interior sides similar to old cast-iron pipes. The result was the construction by the author of a new formula for the flow of water in pipes having very smooth interior sides, and the conclusion that two formulas constructed by the late Henry Darcy were well adapted for pipes having interior sides similar to new cast-iron pipes. A general formula was not discovered which would apply satisfactorily to old cast iron pipes, but the author has given, in Table No. 2, a series of multipliers which can be used for preliminary work in connection with the table, for very approximately estimating the increase of loss of head due to friction which may take place in pipes that have been in service five or more years.

LANDSCAPE ARCHITECTURE.

Notes and Suggestions on Lawns and Lawn Planting—Laying out and Arrangement of Country Places, Large and Small Parks, Cemetery Plots, and Railway-Station Lawns—Deciduous and Evergreen Trees and Shrubs—The Hardy Border, Bedding Plants—Rockwork, etc. By Samuel Parsons, Jr. Cloth, 9 x 6 ins., 22 + 329 pp., illus. New York, G. P. Putnam's Sons, 1904. $2.00.

The introduction states that the object of this book is to stimulate interest in an inexpensive style of landscape gardening by enunciating a few practical, fundamental principles and to give an account of some examples of well-laid-out grounds and a description of some of the best lawn plants. The chapter headings are: Introduction; The Lawn; The Treatment of Sloping Grounds; Spring Effects on the Lawn; Trees and Shrubs for June Effects on the Lawn; The Flowers and Foliage of Summer; Green Autumnal Foliage; Autumn Color on the Lawn; Lawn-Planting for Winter Effect; Garden Flowers; Grandmother's Garden; Bedding Plants; The Ornamentation of Ponds and Lakes; Lawn Planting for Small Places; City Parks; Railway, Churchyard and Cemetary Lawn-Planting; Nookeries on the Home Grounds; My Friend the Andromeda. There is an index of thirteen pages.

HANDBOOK OF TIMBER PRESERVATION.

By Samuel M. Rowe, M. Am. Soc. C. E. Souvenir Edition, Revised. Leather, 6 x 4 ins., 204 pp., illus. Chicago, Pettibone, Sawtell & Co., 1904. (Donated by the author.)

Since 1885 the author has labored to perfect the methods and appliances, studying each principle and all questions connected with the operation of timber preserving, in the direction of convenience, economy and effectiveness. It is not pretended that the operator can take up the matter from the book and proceed at once to run the business, but the treatise will be of service as a handbook and guide during the operation of the plant as well as in giving hints during the construction. The second edition is published after being revised and extended in its scope. An effort has been made to bring in the writing of other experienced men, as well as to add many items of experience and results of experiments that will aid the student and operator in a fuller understanding of the principles involved in the operation, the nature of the chemicals used, and the character of the woods treated.

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* Unless otherwise specified books in this list have been donated by the publishers.

PRACTICAL LESSONS IN ELECTRICITY.

Elements of Electricity; The Electric Current, by L. K. Sager. Electric Wiring, by H. C. Cushing, Jr. Storage Batteries, by F. B. Crocker, M. Am. Inst. E. E. Cloth, 10 x 7 ins., illus. Chicago, American School of Correspondence.

This volume consists of four of the forty-five regular textbooks in the electrical engineering course of the American School of Correspondence at Armour Institute of Technology, bound together in convenient form, but not in the order usually studied. The purpose of the volume is to give the public an opportunity to judge of both the standard and the scope of the instruction offered, the elementary instruction being illustrated by the first half, and the advanced instruction by the last half, of the book. Although published primarily to demonstrate the character of the textbooks of the school, and representing only a fragmentary part of the complete electrical engineering course, yet it is believed that this volume has in itself enough practical information to make it an addition to the library of the expert electrician as well as to that of the amateur.

LES PORTS MARITIMES DE L'AMÉRIQUE DU NORD SUR L'ATLANTIC.

Par Le Baron Quinette de Rochemont et H. Vetillart. Paper, 9½ x 6 ins., Atlas 22 x 15 ins., 3 vol., with Atlas. Paris, Vve. Ch. Dunod, 1898–1904. 65 francs.

Volume I of this work relates to the Canadian ports and Volume II is a study of the administration of navigable ways. Volume III is a monograph on the principal harbors on the eastern coast of the United States: Portland, Sandy-Bay, Boston, New York, Baltimore, Philadelphia, Newport News, Norfolk, Portsmouth, Charleston and Savannah. There is a description of each of these harbors giving its geographical and hydrographical situation, its nautical conditions, the improvements which have been made by the National and State Governments, by local authorities and private enterprise. Statistical information is given which shows the commercial importance, the progress and the customs and taxes received by the public authorities.

LES RÉGULATEURS DES MACHINES À VAPEUR.

Par L. Lecornu. Paper, 12 x 9 ins., 313 pp., illus. Paris, Vve. Ch. Dunod, 1904. 12 francs, 50.

In this work the author has developed, aside from his own theory, the theories of different French and foreign authors, and has compared and discussed them. The book is in two parts: Part. I. Cinématique et Statique du Regulateur; Part II. Dynamique du Régulateur. Part I gives a list of the efforts made to perfect the Watt machine: regulators with centrifugal force, pneumatic, marine, electric, etc. There are many documents on this subject, and the author has brought them all together. The work closes with a treatise on the experiments made to simplify the functions of the regulator. There is an analytical table and an alphabetical index.

Gifts have also been received from the following:

Am. Academy of Arts and Sciences. 7 bound vol., 10 vol.
Am. Gas Light Assoc. 18 bound vol.
Am. Soc. Mech. Engrs. 2 vol.
Asociación de Ingenieros Industriales de Barcelona. 14 vol., 1 no.
Associacao dos Engenheiros Civis Portuguezes. 3 nos.
Atkinson, Edward. 26 pam.
Babcock, J. M. 1 bound vol.
Brackett, Dexter. 1 vol.
Brit. Columbia—Bureau of Provincial Information. 1 bound vol., 4 vol., 6 pam.
Brockton, Mass.—Water Commrs. 1 pam.
Brooklyn, N. Y.—Borough President. 1 bound vol.
Brooklyn, N.Y.—Pub. Lib. 1 vol.
Burlington, Vt.—City Clerk. 1 vol.
Burlington, Vt.—Water Dept. 1 pam.
Buxton, Clifford. 6 vol.
Cal.—Dept. of Highways. 3 pam.
Cambridge, Mass.—City Clerk. 1 bound vol.
Canada—Chf. Engr. of Rys. and Canals. 1 vol.
Canada—Geol. Surv. 1 vol.
Canadian Soc. of Civ. Engrs. 2 pam.
Castellá, Andres. 2 pam.
Church, C. T. 1 pam.
City Record. 1 bound vol.
Civ. Engineers' Club of Cleveland. 1 pam.
Clarkson School of Tech. 1 pam.
Collegio degli Ingegneri ed Architetti in Palermo. 1 vol.
Collegio Toscano degli Ingegneri ed Architetti. 1 bound vol., 21 vol., 9 pam.
Colo.—Commr. of Mines. 1 pam.
Conn.—State Board of Health. 1 bound vol.
Cunningham, A. C. 1 pam.
Delaware Coll. 6 pam.
Eng. Assoc. of the South. 2 vol.
Essex County, N. J.—Park Comm. 4 pam.
Fall River, Mass.—Watuppa Water Board. 2 pam.
Finch, John W. 1 pam.
Fitchburg, Mass.—City Engr. 1 pam.

Great Britain—Patent Office. 4 vol., 5 pam.
Halifax, N. S.—City Engr. 1 pam.
Hunt, Chas. Warren. 1 pam.
Imperial Earthquake Investigation Committee. 1 vol.
Ingenioren. 3 vol., 4 nos.
Inst. of Civ. Engrs. 1 bound vol., 2 vol.
Inst. of Gas Engrs. 1 bound vol.
Iowa—Sec. of State. 1 bound vol.
John Crerar Lib. 1 pam.
Klein, Otto H. 1 bound vol.
Lake Erie & Western R. R. Co. 1 pam.
Lynn, Mass.—Board of Pub. Works, 1 pam.
Madras—Public Works Dept. 1 bound vol.
Me.—Forest Commr. 1 bound vol., 1 vol.
Mass.—Board of Harbor and Land Commrs. 2 bound vol., 14 pam.
Mayne, Charles. 1 vol.
Mazoyer, M. 1 pam.
Medford, Mass.—Water Commrs. 1 pam.
Michigan Central R. R. Co. 1 pam.
Mo.—R. R. & Warehouse Comm. 1 bound vol.
Moberly, Frank. 1 bound vol., 2 pam., 7 maps.
Montreal, Que.—City Surveyor. 18 pam.
National R. R. Co. of Mexico. 1 pam.
N. J.—Commr. of Pub. Roads. 1 pam.
N. Y. City—Commrs. of Accounts. 1 bound vol.
N. Y. State—Dept. of Agri. 3 bound vol.
N. Y. State—Supt. of Forests. 2 vol., 3 pam.
N. Y. State—Supt. of Pub. Bldgs. 3 vol., 1 bound vol.
New York, Chicago & St. Louis R. R. Co. 1 pam.
N. C.—Geol. Surv. 9 vol., 5 pam.
North of England Inst. of Min. and Mech. Engrs. 1 vol.
North-West Ry. Club. 7 vol.
Northern Central Ry. Co. 1 pam.
Norwich Univ. 1 vol.
Nova Scotia—Dept. of Mines. 17 pam.
Ohio—Bureau of Labor Statistics. 3 bound vol.
Peckham, S. F. 1 bound vol.
Penn.—Bureau of Industrial Statistics. 8 bound vol.
Phillips, Hiram. 12 bound vol.
Pinchot, Gifford. 1 pam.
(The) Polytechnic. 5 vol.
Progress Pub. Co. 1 bound vol.
R. I.—R. R. Commr. 1 bound vol.
Rowe, Samuel M. 1 bound vol.
Royal Soc. of Canada. 1 bound vol.
Rutgers Coll. 20 pam.
Salem, Mass.—Water Board. 1 pam.
San Francisco—Board of Supervisors. 1 bound vol.
Sociedad Cientifica "Antonio Alzate." 3 vol., 6 nos.
Société Belge des Ingénieurs et des Industriels. 3 pam.
Société des Ingénieurs Civils de France. 1 vol.
Somerville, Mass.—Board of Health. 11 pam.
Soper, George A. 1 pam.
South Australia—Rys. Commr. 1 pam.
Swarthmore Coll. 1 vol.
Switzerland—Bureau Hydrometic Fédéral. 3 pam.
Taunton, Mass.—Water Commrs. 1 pam.
Tighe, James L. 1 pam.
Umstead, C. H. 2 pam.
U. S. Board on Geographic Names. 1 bound vol., 1 pam.
U. S. Bureau of Construction and Repair. 4 pam.
U. S. Bureau of Fisheries. 7 bound vol., 2 vol.
U. S. Bureau of Forestry. 1 bound vol., 2 vol., 35 pam.
U. S. Bureau of Insular Affairs. 1 pam.
U. S. Bureau of Statistics. 1 bound vol., 2 vol.
U. S. Bureau of Steam Eng. 2 pam.
U. S. Civil Service Comm. 5 bound vol., 1 vol., 2 pam.
U. S. Coast and Geodetic Surv. 2 vol., 6 pam.
U. S. Commr. of Education. 1 bound vol.
U. S. Dept. of Agri. 2 pam.
U. S. Dept. of Labor. 6 bound vol., 2 pam.
U. S. Div. of Foreign Markets. 27 pam.
U. S. Geol. Surv. 9 vol.
U. S. Hydrographic Office. 8 pam.
U. S. Interstate Commerce Comm. 4 pam.
U. S. Naval Academy. 11 pam.
U. S. Naval Inst. 4 vol., 2 nos.
U. S. Ordnance Office. 4 pam.
U. S. War Dept. 15 Specif.
Univ. of Ill. 5 vol.
Univ. of Kans. 24 pam.
Univ. of Mich. 2 pam.
Univ. of Minn. 1 vol., 1 pam.
Univ. of Toronto. 14 vol.
Vt.—State Geol. 1 pam.
Waltham, Mass.—Water Dept. 1 pam.
Wash.—Bureau of Statistics, Agriculture and Immigration. 2 bound vol.
Wash.—State Mine Inspector. 1 vol., 4 pam.
W. Va.—Chief Mine Inspector. 2 vol., 2 pam.
W. Va.—State Geol. 1 bound vol., 1 vol., 1 sheet.
Western Ry. Club. 15 nos.
Western Soc. of Engrs. 1 bound vol.
Weston, Edmund B. 1 bound vol.
Wiley, Wm. H. 1 pam.
Wyo.—State Geol. 1 vol., 5 pam.
Yonkers, N. Y.—Water Commrs. 1 pam.
Unknown. 1 bound vol.

BY PURCHASE.

A Manual of Marine Engineering: Comprising the Design, Construction and Working of Marine Machinery. By A. E. Seaton, M. Inst. C. E., M. Inst. E. E. Fifteenth Edition, thoroughly Revised, Enlarged, and in Part Re-Written. London, Charles Griffin and Company, Limited, 1904.

An Elementary Treatise on Hoisting Machinery, Including the Elements of Crane Construction and Descriptions of the Various Types of Cranes in Use. By Joseph Horner. Philadelphia, J. B. Lippincott Company, London, Crosby Lockwood and Son, 1903.

Traité Théoretique et Practique de Métallurgie Générale. Par L. Babu. Vol. I. Paris, Ch. Beranger, 1904.

Transactions of the American Ceramic Society. Vol. I–II. Columbus, 1900.

Proceedings of the United States Naval Institute. Vol. 5, Nos. 6–7, 10. 1878–79. Annapolis, 1878–79.

The Encyclopedia Americana. A General Dictionary of Arts and Sciences, Literature, History, Biography, Geography, etc., of the World. Vol. 9–11. New York, Chicago, The American Company.

Compendium of Drawing. Compiled from the Instruction Papers in the Mechanical Engineering and Sheet Metal Pattern Drafting Courses of the American School of Correspondence at Armour Institute of Technology. 2 vol. Chicago.

Facts on Fire Prevention. The results of Fire Tests Conducted by the British Fire Prevention Committee. Edited by Edwin O. Sachs. 2 vol. London, B. T. Batsford, 1902.

SUMMARY OF ACCESSIONS.

April 13th to May 10th, 1904.

Donations (including 62 duplicates and 16 numbers completing volumes of periodicals)	662
By purchase	13
Total	675

MEMBERSHIP.

ADDITIONS.

MEMBERS.

		Date of Membership.
Aims, Walton Irving. Chf. Engr., New York Tunnel Co., 9 East 126th St., New York City		May 4, 1904
Allen, William Bullard. Land Agt., Tennessee Coal, Iron & R. R. Co., P. O. Box 873, Birmingham, Ala		Feb. 3, 1904
Cartlidge, Charles Hopkins. Bridge Engr., C., B. & Q. R. R., 209 Adams St., Room 61, Chicago, Ill		May 4, 1904
Collins, Roderick Greene, Jr. Engr. and Gen. Supt., New York Contr. & Trucking Co., 506 East 20th St., New York City		May 4, 1904
Dean, Arthur Warren. State Engr., State House, Concord, N. H		May 4, 1904
Elliott, James Rutherford. Civ. and Min. Engr. (Elliott & Baton), 1311 Keystone Bldg., Pittsburg, Pa	Assoc. M. M.	Sept. 4, 1901 April 5, 1904
Gillette, Halbert Powers. Assoc. Editor *Engineering News*, 19th Floor, St. Paul Bldg. (Res., 504 West 151st St.), New York City		May 4, 1904
Jacobs, Charles Mattathias. 128 Broadway, New York City		May 4, 1904
Jones, William Henry. 315 Vine St., Leavenworth, Kans		May 4, 1904
Kenly, Edward Marion. Supt., Gorman Coal & Coke Co., Austen, Preston Co., W. Va		May 4, 1904
Lovell, Walter Danville. Equitable Bldg., Des Moines, Iowa		May 4, 1904
MacHarg, William Storrs. 220 City Hall, Chicago, Ill		Dec. 2, 1903
Macksey, Henry Vincent. 44 City Hall, Boston, Mass		May 4, 1904
Newbrough, William. Civ. and Min. Engr., Evanston, Wyo		April 6, 1904
Quinby, Edwin Rufus. City Surv., 52 Duane St., New York City		May 4, 1904
Snow, Frank Herbert. (Snow & Barbour, Civ. and San. Engrs.), Tremont Bldg., Boston, Mass	Assoc. M. M.	June 4, 1895 May 3, 1904
Stone, Everett Edward. Asst. Chf. Engr., Boston & Albany R. R., Springfield, Mass		May 4, 1904
Stuart, Joseph Thompson. Engr. of Constr., P. R. R. Co., 1625 North 16th St., Philadelphia, Pa		May 4, 1904
Tretter, Gustav Adolph. Asst. Supt. and Engr., Erecting Dept., The Phœnix Bridge Co.. Phœnixville, Pa		April 6, 1904
Tsuji, Taro. Engr., Govt. Ry. Office, 24 Hongo Umicho Nichome, Tokyo, Japan	Jun. Assoc. M. M.	Oct. 8, 1891 Oct. 4, 1899 Mar. 1, 1904

		Date of Membership.
Warman, Frederick Conover. U. S. Asst. Engr., 2001 I St., N. W., Washington, D. C.	Assoc. M. M.	Jan. 3, 1900 May 3, 1904
Webb, Walter Loring. Cons. Engr., 810 Girard Trust Bldg., Philadelphia, Pa.	Assoc. M. M.	May 4, 1892 May 3, 1904
Wolf, Julius Herman George. Asst. Engr., U. S. Engr. Office, 92 Flood Bldg., San Francisco, Cal.	Assoc. M. M.	May 7, 1902 April 5, 1904

ASSOCIATE MEMBERS.

Bassett, Robert Jay. 9816 Ewing Ave., South Chicago, Ill.	Jun. Assoc. M.	Feb. 3, 1903 Feb. 3, 1904
Butcher, William Laramy. Asst. Engr., Mass. State Board of Health, 140 State House, Boston, Mass.		May 4, 1904
Clermont, John Baptiste. Gen. Supt. of Building Constr., 167 Second St., Williamsbridge, New York City		May 4, 1904
Cokefair, Francis Albertson. Chf. Engr., Great Northern Power Co., Duluth, Minn.		April 6, 1904
Davis, James Lyford. 7 West 124th St., New York City		May 4, 1904
Galbreath, William Otto. Care, San Carlos Copper Co., San José, Tamaulipas, Mexico		April 6, 1904
Gayler, Ernest Rotteck. Civ. Engr., U. S. N., Navy Yard, New London, Conn.		April 6, 1904
Given, Richard Alexander. 364 Randolph Bldg., Memphis, Tenn.		Feb. 3, 1904
Greene, Albert Emerson. Asst. Prof. of Civ. Eng., Univ. of Michigan, 415 E. William St., Ann Arbor, Mich.		May 4, 1904
Klossowski, Theodore Julius. Care, International Portland Cement Co., Ottawa, Ont., Canada		April 6, 1904
Leffler, Burton Rutherford. 17 Olive Pl., Cleveland, Ohio.		April 6, 1904
Lund, Robert Leathan. Cons. Engr., Elk Bldg., Little Rock, Ark.		May 4, 1904
Reaburn, DeWitt Lee. Care, U. S. Geological Survey, Washington, D. C.		April 6, 1904
Umstead, Charles Henry. Supt. of Constr., U. S. Public Bldgs., Office of the Superv. Archt., U. S. Treasury Dept., Lawrence, Mass.	Assoc. Assoc. M.	May 5, 1903 May 3, 1904
West, Oscar James. Res. Engr., The Phœnix Bridge Co., 453 The Rookery, Chicago, Ill.		May 4, 1904
Williams, Walter Scott. Asst. Prof. of Civ. Eng., Univ. of Missouri, 906 Conley Ave., Columbia, Mo.		April 6, 1904
Woodard, Wilkie. City Engr., City Hall, Shreveport, La.		May 4, 1904
Woods, Andrew Alfred, Jr. Res. Engr., A. & V. Ry., Vicksburg, Miss.		May 4, 1904

JUNIORS.	Date of Membership.
Greenlaw, Ralph Weller. 231 West 125th St., New York City	May 3, 1904
Merrill, Robert Hall. 166 Summer St., Grand Rapids, Mich.	May 3, 1904
Roberts, Harry Ashton. Care, Engr.'s Office, D., L. & W. R. R., Hoboken, N. J.	April 5, 1904

CHANGES OF ADDRESS.

MEMBERS.

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Woodcock, Henry Wright.........361 Ocean Ave., Brooklyn, N. Y.

DEATHS.

Ainslee, James W.	Elected Fellow, May 28th, 1872; died September 13th, 1902.
Ainsworth, Danforth Hurlbut.	Elected Member, March 3d, 1886; died April 24th, 1904.
Richardson, B. Frank	Elected Member, July 1st, 1885; died April 18, 1904.
Storrow, Charles Storer	Elected Honorary Member, January 24th, 1883; died April 30th, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(April 14th to May 10th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(**1**) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(**2**) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(**3**) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(**4**) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(**5**) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(**6**) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(**7**) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(**8**) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(**9**) *Engineering Magazine*, New York City, 25c.
(**10**) *Cassier's Magazine*, New York City, 25c.
(**11**) *Engineering* (London), W. H. Wiley, New York City, 25c.
(**12**) *The Engineer* (London), International News Co., New York City, 35c.
(**13**) *Engineering News*, New York City, 15c.
(**14**) *The Engineering Record*, New York City, 12c.
(**15**) *Railroad Gazette*, New York City, 10c.
(**16**) *Engineering and Mining Journal*, New York City, 15c.
(**17**) *Street Railway Journal*, New York City, 35c.
(**18**) *Railway and Engineering Review*, Chicago, Ill., 10c.
(**19**) *Scientific American Supplement*, New York City, 10c.
(**20**) *Iron Age*, New York City, 10c.
(**21**) *Railway Engineer*, London, England, 25c.
(**22**) *Iron and Coal Trades Review*, London, England, 25c.
(**23**) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(**24**) *American Gas Light Journal*, New York City, 10c.
(**25**) *American Engineer*, New York City, 20c.
(**26**) *Electrical Review*, London, England.
(**27**) *Electrical World and Engineer*, New York City, 10c.
(**28**) *Journal*, New England Water-Works Assoc., Boston, $1.
(**29**) *Journal*, Society of Arts, London, England, 15c.
(**30**) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(**31**) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(**32**) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(**33**) *Le Génie Civil*, Paris, France.
(**34**) *Portefeuille Economique des Machines*, Paris, France.
(**35**) *Nouvelles Annales de la Construction*, Paris, France.
(**36**) *La Revue Technique*, Paris, France.
(**37**) *Revue de Mécanique*, Paris, France.
(**38**) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(**39**) *Railway Master Mechanic*, Chicago, Ill., 10c.
(**40**) *Railway Age*, Chicago, Ill., 10c.
(**41**) *Modern Machinery*, Chicago, Ill., 10c.
(**42**) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(**43**) *Annales des Ponts et Chaussées*, Paris, France.
(**44**) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(**45**) *Mines and Minerals*, Scranton, Pa., 20c.
(**46**) *Scientific American*, New York City, 8c.
(**47**) *Mechanical Engineer*, Manchester, England.
(**54**) *Transactions*, Am. Soc. C. E., New York City, $5.
(**55**) *Transactions*, Am. Soc. M. E., New York City, $10.
(**56**) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(**57**) *Colliery Guardian*, London, England.
(**58**) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(**59**) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(**60**) *Municipal Engineering*, Indianapolis, Ind., 25c.
(**61**) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(**62**) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(**63**) *Minutes of Proceedings*, Inst. C. E., London, England.
(**64**) *Power*, New York City, 20c.
(**65**) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(**66**) *Journal of Gas Lighting*, London, England, 15c.
(**67**) *Cement and Engineering News*, Chicago, Ill., 25c.
(**68**) *Mining Journal*, London, England.
(**69**) *Mill Owners*, New York City, 10c.
(**70**) *Engineering Review*, New York City, 10c.
(**71**) *Journal*, Iron and Steel Inst., London, England.
(**73**) *Electrician*, London, England, 18c.
(**74**) *Transactions*, Inst. of Min. and Metal., London, England.
(**75**) *Proceedings*, Inst. of Mech. Engrs. London, England.

LIST OF ARTICLES.

Bridge.

Recent Road-Bridge Practice in New South Wales.* Henry Harvey Dare, Assoc. M. Inst. C. E. (63) Vol. 155.

The Value of Inspection of Metal Bridges During Construction and Erection. Walter L. Golden. (Paper read before the Engineers' Soc. of Western New York.) (1) Mar.

Construction of a Scherzer Double-Roller Lift Bridge at Middle Seneca Street, Cleveland, Ohio.* William J. Carter. (Paper read before the Civ. Engineers' Club of Cleveland.) (1) Mar.

Some Points in Bridge Design: Effect on Trusses and Plate Girders Due to Imperfect Roller-Support.* Geo. N. Linday. (4) Apr.

The Elizabeth Bridge, Budapest.* (12) Serial beginning Apr. 15.

A Long-Span Double-Track Plate-Girder Bridge.* (14) Apr. 16.

The Erection of the Clairton Bridge.* (14) Apr. 16.

The Design of Concrete Steel Arches. E. J. McCaustland. (Paper read before the Amer. Assoc. for the Advancement of Science.) (13) Apr. 21.

Erecting Bridge Spans by Sliding Them Forward from the Shore.* (13) Apr. 21.

Highway Bridges in the Croton Valley.* (14) Apr. 23.

Replacing a Lattice-Girder Bridge with Plate Girders.* (14) Apr. 23.

Concrete Railway Bridges.* (46) Apr. 23.

New Counterbalanced Swing Bridge, C., M. & St. P. Ry.* (18) Apr. 23.

Masonry for the Blackwell's Island Bridge.* (15) Apr. 29.

The Fraser River Bridge, British Columbia.* (14) Serial beginning Apr. 30.

The Harway Avenue Bascule Bridge, New York City.* (14) Apr. 30.

Interlocking Steel Sheet Piles for Bridge Pier Cofferdams.* (14) Apr. 30.

Test to Destruction of a 65-ft. Truss Bridge Span of Reinforced Concrete.* (13) May 5.

A Large Plate Girder Bridge on the Erie.* (15) May 6.

La Chaine avec l'Arc.* M. Legay. (43) 4e Trimestre, 1903.

Un Tracé Géométrique des Paraboles Cubiques et Ses Applications aux Lignes d'Influence dans les Poutres Continues.* Farid Boulad. (43) 4e Trimestre, 1903.

Note sur l'Approximation des Formules de Flexion des Arcs.* M. Mesnager. (43) 4e Trimestre, 1903.

Essai à Outrance du Pont d'Ivry.* M. Considère. (43) 3e Trimestre, 1903.

Notice sur un Pont en Béton Armé, Système Hennebique, Construit sur l'Aisne, à Soissons.* M. Riboud. (43) 3e Trimestre, 1903.

Note sur la Construction du Viaduc des Fades (Ligne de Saint-Éloy à Pauniat).* M. Virard. (43) 3e Trimestre, 1903.

Ponts Roulants à Bascule, Système Scherzer: Pont de Barking (Angleterre).* (33) Apr. 2.

Electrical.

Line Effects in Long-Distance Transmission of Power by Electricity. Henry James Shedlock Heather, Assoc. M. Inst. C. E. (63) Vol. 155.

Better Electric Insulation. C. E. Farrington. (69) Mar.

Gas Power for Central Stations. J. R. Bibbins. (42) Mar.

The Conductivity of the Atmosphere at High Voltages.* Harris J. Ryan. (42) Mar.

European Practice in the Construction and Operation of High-Pressure Transmission Lines and Insulators.* Guido Semenza. (42) Mar.

Notes on Fly-Wheels (for reciprocating engines direct connected to alternators). H. H. Barnes, Jr. (42) Mar.

Distorted Alternating and Rotating Magnetic Fields. R. Goldschmidt. (26) Serial beginning Apr. 8.

The New Electricity Works and Tramways of West Ham.* (26) Apr. 8.

The Adaptability of Electrical Driving. B. Longbottom. (Abstract of paper read before the Manchester Assoc. of Engrs.) (73) Apr. 8; (47) Apr. 16.

Single-Phase Motors.* (73) Serial beginning Apr. 8.

Notes on Impedance Coils.* C. Faraday Proctor. (Abstract of Paper read before the Inst. E. E.) (73) Apr. 8.

Design of Small Dynamos.* J. W. Burleigh. (26) Apr. 8.

Electric Conduit Construction at Memphis, Tenn.* F. G. Proutt. (13) Apr. 14.

Aston Manor Electricity Works.* (26) Apr. 15.

Small Gas Engines *v.* Electric Motors. H. E. M. Kensit. (26) Apr. 15.

150-Horse-Power Compound Electric-Light Engines for the Royal Navy.* (11) Apr. 15.

Eddy Currents in Cable Sheaths. M. B. Field. (Paper read before the Inst. E. E.) (73) Serial beginning Apr. 15.

Localisation of Faults on Low-Tension Networks. W. E. Groves. (Abstract of Paper read before the Inst. E. E.) (73) Apr. 15; (26) Serial beginning Apr. 8.

Experiments with a New Primary Cell. Geo. P. Bousfield. (Paper read before the Faraday Soc.) (73) Apr. 15.

A General Diagram for Alternators. (73) Apr. 15.

A Long-Span Transmission Line.* B. Wiley. (27) Apr. 16.

The Efficiency Curves of Constant-Potential Transformers. A. E. Kennelly. (27) Apr. 16.

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Theoretical Determination of Power Curves. (**27**) Apr. 16.
Design of Continuous-Current Motors for Variable Speed. Franklin Punga. (**26**) Apr. 22.
Sunderland Corporation New Electricity Works.* (**26**) Apr. 22.
Dynamo and Motor Testing. C. F. Smith. (Abstract of Paper read before the Civ. and Mech. Engineers' Soc.) (**26**) Serial beginning Apr. 22.
Theoretical Basis for the Experimental Pre-Determination of the Regulation of Alternators. Theo. Torda-Heymann. (**73**) Apr. 22.
Methods for Increasing the Transmitter Energy of Wireless Telegraph Systems.* Ferdinand Braun. (**73**) Apr. 22.
Notes on the Design of Electrical Machinery. Louis J. Hunt, Assoc. M. Inst. C. E. (Paper read before the Liverpool Eng. Soc.) (**47**) Serial beginning Apr. 23; Abstract (**73**) Apr. 29.
The Atlanta Water & Electric Power Company's Plant at Morgan Falls.* (**14**) Apr. 23.
The New Telephone Exchange of Berlin.* Emile Guarini. (**19**) Apr. 23.
The Hospitalier Ondograph.* (**19**) Apr. 23
Electric Distribution to Small Manufactories at Sant Mortier, France.* Franz Koster. (**27**) Apr. 23.
The Elementary Principles of Transformer Design. Thomas Gray. (**27**) Serial beginning Apr. 23.
The Prevention of Crosses between Signalling and High Voltage Circuits.* Howard S. Knowlton. (**27**) Apr. 23.
A New Push-Button Voltmeter Switch.* Charles L. Fitch. (**27**) Apr. 23.
100-Ton Double Trolley Alternating Current Crane.* W. W. Briggs. (**27**) Apr. 23.
The Measurement of Electrical Conductivity.* J. Rymer-Jones. (**26**) Serial beginning Apr. 29.
Electric Governing of Steam Turbines.* (From the *Western Electrician* of Chicago.) (**73**) Apr. 29.
Power Station Design.* C. H. Merz and Wm. McLellan. (Abstract of Paper read before the Inst. E. E.) (**73**) Serial beginning Apr. 29.
The Power Plant and Electric Railway Owned by the State of North Dakota.* (**17**) Apr. 30.
Electrolytic Rectifiers for Charging Storage Batteries with Alternating Current. Charles F. Burgess. (Paper read before the Northwestern Elec. Assoc.) (**19**) Apr. 30.
The Plant of the Kansas City Home Telephone Company.* Max Loewenthal. (**27**) Apr. 30.
The Design of Induction Motors with Examples from Recent European Practice. H. M. Hobart. (**27**) Apr. 30.
The Braun Tube in the Study of Alternating Currents. (**27**) Apr. 30.
Construction of a 2-H. P. Direct-Current Motor.* F. C. Mason. (From *Amer. Electrician.*) (**47**) Apr. 30.
A Test for Induction Motor Windings.* G. H. Garcelon. (From *Elec. Club Journal.*) (**47**) Apr. 30.
Tullahoma, Tenn., Water and Light Plant. Granbery Jackson. (**60**) May.
Some Electric Furnace Processes.* J. Wright. (**10**) May.
Practical Applications of Electro-Magnets in the Modern Machine Shop, Iron and Steel Works and Shipyard.* Frank C. Perkins. (**41**) May.
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A Convenient and Economical Electrical Method for Determining Mechanical Torque.* A. S. McAllister. (**27**) May 7.
Central Station Economy. F. H. Davies. (From *Elec. Engr.*) (**24**) Serial beginning May 9.
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Sur les Diagrammes de Fonctionnement d'un Alternateur.* C. F. Guilbert. (**36**) Serial beginning Apr. 25.
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A New Japanese Battleship.* (**12**) Apr. 8.
Steam Turbine Propulsion for Marine Purposes.* A. Rateau. (Abstract of Paper read before the Inst. of Naval Archts.) (**12**) Apr. 8; (**11**) Apr. 8.
Engineering in the Japanese Navy.* Miyabara. (Paper read before the Japanese Soc. of Naval Archts.) (**11**) Apr. 15.
The Normal Pressures on Thin Moving Plates. A. W. Johns. (Abstract of Paper read before the Inst. of Naval Archts.) (**12**) Apr. 15.
The Problem of Screw Propulsion. Arthur Rigg. (**12**) Serial beginning Apr. 15.

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A New Invention for Rendering Vessels Unsinkable.* Herbert C. Fyfe. (**19**) Apr. 16.

Automatic Governing of Marine Engines.* H. M. Wilson. (Paper read before the Northeast Coast Inst. of Engrs. and Shipbuilders.) (**47**) Apr. 16.

The Transverse Strength of Ships.* J. Bruhn. (Paper read before the Inst. of Naval Archts.) (**11**) Apr. 22.

The Management of Belleville Boilers at Sea. E. F. Baker. (Paper read before the North-east Coast Inst. of Engrs. and Shipbuilders.) (**11**) Apr. 29.

Mechanical.

The Manufacture of Welded Pipe.* Victor Beutner. (**58**) Jan.

The De Laval Steam Turbine.* Charles Garrison. (**7**) Mar.

A Standard Unit of Refrigeration. J. C. Bertsch. (**69**) Mar.

The Use of Pulverized Coal for Fuel under Steam Boilers.* J. M. Sweeney. (**4**) Apr.

Notes on Burning Bituminous Coal. John M. Hartman. (**2**) Apr.

New Steam Turbine Developments.* W. L. R. Emmet. (**2**) Apr.

Mechanical Refrigeration of Freight Cars.* Warren H. Miller. (**8**) Apr.

Furnace Charging Cranes.* (**22**) Apr. 1.

Allen's High-Speed Triple Expansion Engine.* (**22**) Apr. 1.

A Few Notes on the Steam Turbine. G. L. Parsons. (Abstract of Paper read before the Inst. E. E.) (**73**) Apr. 8.

Defects in Cast Iron: Their Causes and Remedies. Herbert E. Field. (Paper read before the New England Foundrymen's Assoc.) (**47**) Apr. 9.

The Design of Machinery Shafting.* C. F. Blake. (**47**) Apr. 9.

Friction Clutches on Automobiles.* (**47**) Serial beninning Apr. 9.

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A Slot Milling Machine.* (**40**) Apr. 14.

The Blaisdell Tandem Gas Engine.* (**40**) Apr. 14.

The Crandall Mechanical Lubricating System.* (**40**) Apr. 14.

High Speed Tool Steels. Wm. Lodge. (Abstract of Paper read before the National Metal Trades Assoc.) (**15**) Apr. 15.

The Practical Management of Stationary Steam Boilers.* R. T. Cooke, M. I. Mech. E. (**12**) Apr. 15.

Liquid Fuel Burners.* J. S. V. Bickford. (**11**) Serial beginning Apr. 15.

The Equipment of an Engine Test-House. R. K. Morcom, Assoc. M. I. E. E. (Paper read before the Inst. E. E.) (**12**) Apr. 15; (**11**) Apr. 22; (**47**) Apr. 23.

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The Utilisation of Blast Furnace Slag.* E. R. Sutcliffe. (Abstract of Paper before the West of Scotland Iron and Steel Inst.) (**22**) Apr. 15. (**62**) Serial beginning May 5.

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Teeth in Gearing.* Samuel Diescher. (**62**) Apr. 21.

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The Yale & Towne Mfg. Company's Power Plant.* (**20**) Apr 21,

Popular Motor Cars. Mervyn O'Gorman, M. I. E. E. (**29**) Apr. 22.

High-Speed Tool Steel, Its Manufacture and Uses.* J. M. Gledhill. (Abstract of Paper read before the Coventry Eng. Soc.) (**22**) Apr. 22.

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A New English Aluminium Welding Machine.* Frank C. Perkins. (**46**) Apr. 23.

Chimneys. Chas. L. Hubbard. (**47**) Apr. 23.

The Steam Turbine as an Exhaust Steam Utilizer. (**14**) Apr. 23.

Type-Composing and Distributing Machines.* (**12**) Apr. 29.

The Cooling of Explosion Motors on Automobiles.* J. Grouvelle and H. Arquembourg. (Paper presented to Second International Automobile Cong.) (**47**) Apr. 30.

Rope Transmission in Textile Mills. (**14**) Apr. 30; (**20**) May 5.

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Trials of Rock Drills for Air Consumption. J. B. Carper, E. Goffe, and W. C. Docharty. (**68**) Serial beginning Apr. 30.

Boiler Design and Boiler Explosions. R. S. Hale. (**9**) May.

Hydraulic Cranes and Wharf Machinery.* George H. Baxter. (**9**) May.

Fuel Economy in Steam Plants. John B. C. Kershaw. (**10**) May.

Power Plant of the Yale & Towne Manufacturing Company.* (**64**) May.

Test of the Engines of the Rochester Gas and Electric Company.* (**64**) May.

New Westinghouse Turbine.* (**64**) May.

The Care and Management of Leather Belts.* Walter E. Dixon. (**64**) May.

Some Causes and Remedies for Pounding in Engines.* W. E. Crane. (**64**) May.

Indicator Spring Errors. H. Boyd Brydon. (**64**) May.

Setting Up a Vertical Engine. John F. Nagle. (**64**) May.

Multiple Impact Steam Turbine.* A. M. Levin. (**64**) May.

Lubricating Oils and Their Properties.* Wm. Davis. (**64**) May.

Burning Coke Breeze with Underfeed Stokers. M. E. Malone. (Paper read before the Ohio Gas Light Assoc.) (**24**) May 2.

Burning Coke Breeze on Hollow Grates. C. H. Williams. (Paper read before the Ohio Gas Light Assoc.) (**24**) May 2.

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*Illustrated.

Mechanical—(Continued).

A New Spanish Portland Cement Works.* (13) May 5.
The New Merriman Automatic Bolt Cutter.* (20) May 5.
Modern Methods of Handling Iron Ore from Minnesota Mines to Pittsburg Furnaces.* Charles H. Wright, M. Am. Soc. C. E. (13) May 5.
Rock-Drill Bits.* T. H. Proske. (16) May 5.
The De Brouwer Mechanical Stoker.* (19) May 7.
The Effect of Pressures on the De Laval Steam Turbine. (14) May 7.
Alcohol for Internal Combustion Engines. (14) May 7.
Laying Gas Mains across a River. H. C. Morris. (Abstract of Paper read before the Mich. Gas. Assoc.) (14) May 7.
Deux Appareils Nouveaux pour la Mesure des Déformations Élastiques.* M. Mesnager. (43) 3e Trimestre, 1903.
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*Illustrated.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 6.

AUGUST, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1904.

Entered according to Act of Congress, by the AMERICAN SOCIETY OF CIVIL ENGINEERS in the office of the Librarian of Congress, at Washington.

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◆

The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays Fourth of July, Thanksgiving Day and Christmas Day.

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AMERICAN SOCIETY OF CIVIL ENGINEERS

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

June 1st, 1904.—The meeting was called to order at 8.40 P. M.; James Owen, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 103 members and 11 guests.

The minutes of the meetings of May 4th and 18th, 1904, were approved as printed in the *Proceedings* for May, 1904.

A paper, "On Sedimentation" by Allen Hazen, M. Am. Soc. C. E., was presented by the author.

A written discussion from G. W. Pearsons, M. Am. Soc. C. E., was presented by the Secretary, and the paper was discussed verbally by Messrs. George W. Fuller, George A. Soper, R. S. Weston and the author.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Edmund Hamilton Bowser, Slidell, La.
St. John Clarke, Bogota, N. J.
Frank Winslow Conn, Philadelphia, Pa.
Clark Dillenbeck, Philadelphia, Pa.
Frederic Clark Dunlap, Philadelphia, Pa.
Emory Alexander Ellsworth, Holyoke, Mass.
Alonzo John Hammond, South Bend, Ind.
John Elden Palmer, Boston, Mass.
Frank Julian Sprague, New York City.
Otto Bruno Suhr, Niagara Falls, Ont., Canada.

As Associate Members.

Charles Metcalf Allen, Worcester, Mass.
Charles Webster L Armour, Fort Smith, Ark.
John Henry Best, Peoria, Ill.
Percival Mitchell Churchill, Denver, Colo.
Park Andrew Dallis, Greenville, S. C.
John Lea Dillard, Boxley, W. Va.
Charles Henry Farnham, Canton, China.
James Easton Ferguson, Detroit, Mich.
Mortimer Foster, New York City.
Charles Rice Gow, Boston, Mass.
George Scott Hubbell, Hoboken, N. J.
Thomas John Jones, Keswick, Cal.
Henry James MacNair, Cleveland, Ohio.
Ralph Barton Manter, Canton, China.
Ernest George Matheson, New York City.
Frederic Antes Snyder, Summit, N. J.

As Associates.

Basil Henry Leather, New York City.
John Joseph Monahan, Boston, Mass.

The Secretary made the following announcements:

The transfer of the following candidates, by the Board of Direction, on May 31st, 1904:

FROM ASSOCIATE MEMBER TO MEMBER.

MORTIMER GRANT BARNES, Geneseo, Ill.
GEORGE WARREN FULLER, New York City.
DUNKIN WIRGMAN HEMMING, New York City.
FREDERICK WILLIAM HONENS, Sterling, Ill.
ERNEST BURSLEM THOMSON, Miami, Fla.
JAMES LAWRENCE TIGHE, Holyoke, Mass.

The election of the following candidates, by the Board of Direction:

AS JUNIORS.

On May 3d, 1904,
EDWARD CHRISTIAN DICKE, St. Louis, Mo.
On May 31st, 1904,
JOSEPH MANUEL BABÉ, Santa Clara, Cuba.
WILLIAM JAMES BACKES, West Haven, Conn.
JOHN ROSS BATES, Brooklyn, N. Y.
ERNEST WILLARD CRAWLEY, New Haven, Conn.
JOHN MIFFLIN HOOD, Jr., Baltimore, Md.
EDWIN LORING SPRAGUE, Jr., Brooklyn, N. Y.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

May 31st, 1904.—8.50 P. M.—Vice-President Deyo in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Craven, Croes, Jackson, Knap, Noble, and Osgood.

The following Committee was appointed to arrange for the Annual Convention, which is to be held at the time of the International Engineering Congress at St. Louis, October 3d to 8th, 1904: George H. Pegram, Alfred Craven, Joseph O. Osgood, George S. Davison, Hunter McDonald and Chas. Warren Hunt.

C. C. Schneider was appointed Chairman of a Committee on Concrete and Steel-Concrete. The Committee as appointed is made up as follows: C. C. Schneider, J. E. Greiner, W. K. Hatt, Olaf Hoff, Robert W. Lesley, J. W. Schaub, Emil Swensson, A. N. Talbot, J. R. Worcester.

On motion, the following resolution was adopted:

"Resolved, That letter-ballots for admission to the Society shall hereafter contain the following information only in regard to each candidate:

1. His name.
2. Date and place of his birth.
3. Date and place of graduation (if any), with degree conferred.
4. Present title (if any) and address.
5. A reference to the Blue List on which his record is given in full."

The following resolution was passed:

"Resolved, That for remittances mailed after July 1st, 1904, the cost of membership in the International Engineering Congress be increased to $10, and said subscription to membership must be received before October 1st, 1904."

The resignation of Robert J. Pratt, Assoc. Am. Soc. C. E., was accepted.

Applications were considered and other routine business transacted. Six Associate Members were transferred to the grade of Member, and six candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, September 7th, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and two papers will be presented for discussion, as follows: "The Installation of a Pneumatic Pumping Plant," by Arthur H. Diamant, Jun. Am. Soc. C. E., and "Some Notes on the Creeping of Rails," by Samuel Tobias Wagner, M. Am. Soc. C. E.

Both these papers were printed in *Proceedings* for May, 1904.

Wednesday, September 21st, 1904.—8.30 P. M.—At this meeting three papers will be presented for discussion, as follows: "General Methods for the Calculation of Statically Indeterminate Bridges, as used in the Check Calculations of Designs for the Manhattan Bridge and the Blackwell's Island Bridge, New York," by Frank H. Cilley, S. B.; "A Rational Form of Stiffened Suspension Bridge," by Gustav Lindenthal, M. Am. Soc. C. E.; and "Theory and Formulas for the Analytical Computation of a Three-Span Suspension Bridge with Braced Cable," by Leon S. Moisseiff, Assoc. M. Am. Soc. C. E.

These three papers are printed in this number of *Proceedings.*

INTERNATIONAL ENGINEERING CONGRESS
AND
THIRTY-SIXTH ANNUAL CONVENTION OF THE SOCIETY.

As previously announced, in the Programme of the **International Engineering Congress,** which has been issued to all members of the Society, there will be meetings of the **Congress** at 10 A. M. each day, beginning Monday, October 3d, and continuing throughout the week, the last meeting of the Congress being held on Saturday morning, October 8th. **Members of the Society in all grades are Members of the Congress.**

The **Thirty-Sixth Annual Convention** of the **Society** will be held on the afternoon of Monday, October 3d, in the Hall of Congresses, Louisiana Purchase Exposition, at 2.30 P. M. At this meeting the President will deliver the Annual Address. At the close of the address of the President, the business meeting required by the Constitution will be held. A meeting of the Board of Direction, as required by the Constitution, will be held at a time to be subsequently determined.

A circular, relating to hotel accommodations, which was prepared by the Local Committee of the Society in St. Louis, has been issued to all members, and in this the "Inside Inn" was recommended as, all things considered, the most available for members and their families.

In this circular it is explained that it is impossible to secure a lower rate for transportation than the Exposition excursion rate established by all railroads, this rate being less than the usual, one fare and one-third, round trip, convention rate.

To all members of the Society who have, in response to the circular already issued, specified the subjects it is their purpose to discuss, copies of such of the papers as have been printed in advance form have already been forwarded, and, upon request, the Secretary will be glad to forward such copies to members who have not already asked for them.

Owing to the large number of papers, which cover many subjects, it will be impossible to forward Advance Copies of all papers to all members of the Congress, and it has been necessary to restrict the issue of Advance Copies to those who expect to present discussions either in person at the Congress or by letter.

INTERNATIONAL ENGINEERING CONGRESS.

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UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers **in the center of the Liberal Arts Building,** and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

Robert Moore, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
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John F. Wallace, " " Chicago, Ill.
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PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The **Boston Society of Civil Engineers** will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of the **St. Louis Engineers' Club,** in the business center of St. Louis, will be kept open during the World's Fair season, May 1st to December 1st, 1904, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of the **Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, first Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From May 11th to August 6th, 1904.

DONATIONS.*

GENERAL INDEX TO THE STREET RAILWAY JOURNAL BY SUBJECTS AND AUTHORS.

Oct., 1884, to Dec., 1903, Including Vols. I-XXII. Cloth, 10 x 8 ins., 162 pp. New York, McGraw Publishing Company, 1904. $5.00.

This index covers the articles in the American edition of the *Street Railway Journal.* The differences in the International edition are so great that the index would be practically useless if applied to that. No attempt has been made to preserve the original captions of the articles. Except in the author's index, the index is one of subjects, not of titles, and in a long article, where different topics have been treated at length, separate entries of these different topics have been made as far as possible. In addition, all articles susceptible of geographical designation have been indexed under the name of the city or country to which the subject has pertained. For this reason, it is thought that the entries under each city will comprise practically all the references in the paper to events and apparatus in that city. In case of nearly all the cities the articles are indexed independently of the names of the street railway companies, except where they refer to corporate events, such as a change in officers, annual reports, etc. As far as possible, an article or topic has been entered under one heading only, but it is thought that by the system of cross references adopted any important article can be found readily by a little search.

ELECTRICITY AND MATTER.

By J. J. Thomson. Cloth, 8 x 5 ins., 162 pp., illus. New York, Charles Scribner's Sons, 1904.

In these lectures, given at Yale University in May, 1903, the author has attempted to discuss in a simple and untechnical manner the bearings of the recent advances made in electrical researches upon the views of the constitution of matter and the nature of electricity; two questions which in the author's opinion, are so intimately connected, that the solution of one would supply that of the other. A characteristic feature of recent electrical researches, such as the study and discovery of Cathode and Röntgen rays and radio active substances, has been the degree in which they have involved the relation between matter and electricity. The contents are: Representation of the Electric Field by Lines of Force; Electrical and Bound Mass; Effects Due to the Acceleration of Faraday Tubes; The Automatic Structure of Electricity; The Construction of the Atom; Radio-Activity and Radio-Active Substances.

LES ACIERS SPECIAUX.

Aciers au Nickel, Aciers au Manganèse, Aciers au Silicium. Par Léon Guillet. Préface de Henry Le Chatelier. Paper, 11 x 9 ins., 4 + 100 pp., illus. Paris, Vve. Ch. Dunod, 1904. 10 francs.

The author has attempted, in this work, to show the recent industrial advancement and the progress in the manufacture of steel. He has himself made a number of experiments with special samples of steel and in this work he gives the results and also shows the composition and treatment of different kinds of steel. This book is intended as a study of the micrography of nickel, manganese and silicon steel. It contains the analyses and diagrams of tests of various kinds for steel. An account is given of the conditions under which these various alloys may be used.

FORMULAIRE DES CENTRAUX.

Résumé, par Ordre Alphabétique des Cours et Projéts de l'École Centrale, Augmenté de Tables Usuelles et d'un abrégé de Legislation. Par J. B., Ingenieur des Arts et Manufactures. Deuxième edition, revue, corrigée et complétée. Leather, 6 x 4 ins., 11 + 314 pp., illus. Paris, Vve. Ch. Dunod, 1904. 6 francs.

This handbook contains solutions of problems which engineers are obliged to solve offhand. These were worked out by the author in the courses at the École Centrale.

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* Unless otherwise specified books in this list have been donated by the publishers.

They are presented in dictionary form and have been reduced to pocket size. The author has tried to exclude from the text all theories and long explanations in order to present the problems in a uniform and condensed manner. The manufacturer may find tables and formulas for verifying any plans and the engineer may find in convenient form the necessary matter for studying any project in mechanics. construction, electricity, hydraulics, etc.

BOILER CONSTRUCTION.

A Practical Explanation of the Best Modern Methods of Boiler Construction from the Laying Out of Sheets to the Completed Boiler. By Frank B. Kleinhans. Cloth, 8 x 6 ins., 421 pp., illus., 5 plates. New York, Derry-Collard Company, 1904. $3.00.

The preface states that the matter compiled for this work represents the most modern practice. In trying to get this matter in such shape as to be generally useful, the author has deemed it inadvisable to illustrate and describe the methods used by the builders of each of the many prominent boilers now being built for various classes of work; and, as the operations on different makes of boilers are so similar to each other, it has been considered best to devote a section to the description of boilers in general. Following this, the locomotive boiler is taken up in the order in which the work goes through the shop. Sections are given on testing boilers, and, finally, one section is devoted to useful tables. These tables have been grouped together, and are intended to give, as nearly as possible, all the data necessary in the construction of a boiler, together with the stresses which would be set up in the various members due to steam pressure and expansion. There is an alphabetical index of ten pages.

TREATMENT OF SEPTIC SEWAGE.

By George W. Rafter, M. Am. Soc. C. E. Cloth, 6 x 4 ins., 137 pp. New York, D. Van Nostrand Company, 1904. 50 cents.

In this book the author has attempted to give some of the more important developments in the bacterial treatment of sewage, but, owing to the limitations of size, none of these can be considered very complete. The work is, in effect, a series of hints, together with indications of preferable treatment. The author states that in such a book there is very little original work, and the facts and opinions are necessarily largely drawn from the studies of others. An attempt has been made, so far as possible within the limits of a book of this size, to place the septic method in its proper relation to other systems of sewage disposal.

TRAIN RULES AND TRAIN DISPATCHING.

A Practical Guide for Train Dispatchers, Enginemen, Trainmen and all who have to do with the Movement of Trains. By H. A. Dalby. Leather, 6 x 4 ins., 221 pp., illus. New York, Derry-Collard Company, 1904. $1.50.

The author states that this book is a series of suggestions which have come to him from time to time. In dealing with these subjects he has started at the beginning, hoping to be able to assist those who are in need of instruction. The author hopes that, with this book, the learner, with the experience he himself gains, may attain a valuable degree of proficiency. It is with this hope that this volume is offered as the result of a number of years of experience as operator and train dispatcher in various parts of the country. Some of the subjects dealt with are: Standard code for both single and double track: standard time at all points; clearance cards; staff system of running; protecting trains; special rules, train classification, rights, orders, signals and identification; work trains and extras, location of offices, etc. There is an index of four pages.

ELECTRICAL MOTOR INSTALLATIONS.

A Book for Factory Owners and Other Users of Steam Power. By F. J. A. Matthews, A. M. I. E. E. Boards, 9 x 6 ins., 194 pp., illus. Manchester, Scientific Publishing Company. 2 shillings 6 pence, net.

The author has prepared this second edition, in which a great portion of the matter in the first edition has been re-written and many additions made. He states that all technical terms have been avoided as far as possible. The chapter on motor installations in actual use has been extended, and one has been added on Electricity Applied to Colliery Work. There are thirty-one additional illustrations and an index of three pages.

Gifts have also been received from the following:

Abbot, Henry L. 1 pam.
Ala.—Geol. Surv. 2 bound vol., 3 vol., 6 pam.
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Mittheilungen Uber Gegenstande Des Artillerie, und Genie-Wesens. 6 vol., 1 pam., 3 nos.
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N. J.—State Geologist. 1 bound vol.
N. J—State Sewerage Comm. 1 bound vol.
New South Wales—Dept. of Mines & Agri. 3 bound vol., 4 vol.
New South Wales—Dept. of Pub. Works. 1 bound vol.
New South Wales—Met. Board of Water Supply. 1 pam.
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N. Y.—Commrs. of State Reservation at Niagara. 1 pam.
N. Y. State—Dept. of Labor. 6 bound vol.
N. Y. State—Pub. Bldgs., Dept. of. 1 bound vol.
N. Y. Univ. 1 pam.
New Zealand—Registrar-General. 2 bound vol., 1 vol.
Newlands, Francis G. 2 pam.
Newport, Ky.—Water-Works. 1 pam.
Newton, Mass.—City Engr. 2 pam.
Noble, Alfred. 3 vol.
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Oesterreichischer Ingenieur und Architekten Verein. 1 pam.
Ohio—Geol. Surv. 1 bound vol.
Ohio—State Board of Health. 1 bound vol.,
Ohio Soc. of Survs. and Engrs. 3 vol.
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U. S. Interstate Commerce Comm. 1 bound vol., 2 pam.
U. S. Nautical Almanac Office. 1 bound vol.
U. S. Office of Exper. Stations. 1 pam.
U. S. Office of Pub. Road Inquiries. 3 pam.
U. S. War Dept., Chf. of Staff. 1 map.
U. S. Weather Bureau. 7 bound vol., 4 pam.
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Univ. of Arizona. 1 pam.
Univ. of Ill., Mech. Eng. Dept. 1 pam.
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Univ. of Mich. Eng. Soc. 1 vol.
Univ. of Minn. 8 vol., 20 pam.
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Univ. of Texas Mineral Surv. 1 vol.
Univ. of Vermont. 46 pam.
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Wager Computing Scale Co. 1 diagram.
Washington Univ. 1 vol.
W. Va.—Chf. Mine Inspector. 1 bound vol.
Wilmington—Board of Park Commrs. 1 pam.
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Woodbridge, S. H. 1 pam.
Woodbury, C. J. H. 1 pam.
Woods, Robert P. 1 pam
Worcester, Mass.—City Engr. 2 pam.
Wyoming—State Geologist. 2 pam.

BY PURCHASE.

Traite Theorique et Pratique des Moteurs a Gaz et a Pétrole. Par Aimé Witz. 4e édition, Refondue et Entièrement Remanice. 2 vol. Paris, E. Bernard, 1903–1904.

A Treatise on the Principles and Practice of Dock Engineering. By Brysson Cunningham, Assoc. M. Inst. C. E. London, Charles Griffin & Company, Limited, 1904.

Report of the Departmental Committee on the Use of Electricity in Mines; appointed by H. M. Principal Secretary of State for the Home Department. London, 1904.

Traité Pratique de Traction Électrique. Par L. Barbillion et G. J. Griffisch. 2 vol. Paris, E. Bernard et Cie, 1903.

Berechnung und Konstruktion der Schiffsmaschinen und =Kessel: Ein Handbuch zum Gebrauch für Konstrukteure, Seemaschinisten und Studierende. Von G. Bauer, unter Mitwirkung der E. Ludwig, A. Boettcher und H. Foettinger. Zweite vermehrte und verbesserte Auflage. München und Berlin, R. Oldenburg, 1904.

Official Gazette of the United States Patent Office. 16 vol., 106 nos.

Report on the Warrior Coal Basin. By Henry McCalley, Assistant State Geologist, Geological Survey of Alabama. Jacksonville, Fla., 1900.

The Encyclopedia Americana. A General Dictionary of Arts and Sciences, Literature, History, Biography, Geography, etc., of the World. Vol. 12–15. New York, Chicago, The American Company.

Engineering Standards Committee. Report on the Influence of Gauge Length and Section of Test Bar on the Percentage of Elongation. By W. C. Unwin. London, Crosby Lockwood and Son, 1903. (British Standard Sections, No. 3.)

Engineering Standards Committee. Beams. London, Crosby Lockwood and Son, 1903. (British Standard Sections, No. 4.)

Die Dampfturbinen mit einem Anhange über die Aussichten der Wärmekraftmaschinen und über die Gasturbine. Von Dr. A. Stodola. Zweite, bedeutend erweiterte Auflage. Berlin, Julius Springer, 1904.

The Metallurgy of Steel. By F. W. Harbord; with a Section on the Mechanical Treatment of Steel. By J. W. Hall, A. M. Inst. C. E. London, Charles Griffin & Company, 1904.

Sciences et Arts Militaires. Organisation Militaire—Tactique—Artillerie—Transports a la Suite des Armées Droit Militaire. Par Émile Dardart, et Le Capitaine X. de l'Infanterie Coloniale. Paris, Vve Ch. Dunod, 1904. (Bibliothèque du Conducteur de Travaux Publics.)

Entropy; or, Thermodynamics from an Engineer's Standpoint, and the Reversibility of Thermodynamics. By James Swinburne. Westminster, 1904.

The Experimental Bacterial Treatment of London Sewage, being an Account of the Experiments carried out by the London County Council between the years 1892 and 1903. By Frank Clowes and A. C. Houston. Printed for the London County Council, London.

Ready Reference Tables, Vol. I. Based on the Accurate Legal Standard Values of the United States, Conveniently Arranged for Engineers, Physicists, Students, Merchants, etc. By Carl Hering, Past-Pres., Am. Inst. E. E. New York, John Wiley and Sons; London, Chapman and Hall, Limited, 1904.

The Theory of the Lead Accumulator (Storage Battery). By Friedrich Dolezalek. Translated from the German, with the Sanction of the Author, by Carl L. von Ende. New York, John Wiley and Sons; London, Chapman and Hall, Limited, 1904.

English and American Steam Carriages and Traction Engines. By William Fletcher, M. Inst. Mech. E. New York, Longmans, Green & Co., 1904.

Michigan Engineer. Containing the Proceedings of the Michigan Engineering Society for 1904. Published by the Society, Climax, Mich.

Trow's General Directory of the City of New York. Vol. 118. 1904. New York, Trow Directory Co.

SUMMARY OF ACCESSIONS.

May 11th to August 6th, 1904.

Donations (including 39 duplicates and 35 numbers completing volumes of periodicals)	676
By purchase	20
Total	696

MEMBERSHIP.

ADDITIONS.

MEMBERS.		Date of Membership.
Ahern, Jeremiah. Engr., U. S. Geological Survey, Reclamation Service, Cody, Wyo		May 4, 1904
Barnes, Mortimer Grant. U. S. Junior Engr., R. F. D., No. 2, Geneseo, Ill	Assoc. M. M.	Nov. 2, 1898 May 31, 1904
Bowser, Edmund Hamilton. Gen. Mgr., Southern Creosoting Co., P. O. Box 37, Slidell, La		June 1, 1904
Clarke, St. John. Bogota, N. J	Jun. M.	Sept. 5, 1888 June 1, 1904
Conn, Frank Winslow. Chf. Engr., Transit Finance Co. of New York and Philadelphia, 2126 Land Title Bldg., Philadelphia, Pa		June 1, 1904
Dillenbeck, Clark. Asst. Engr., P. & R. Ry. Co., 502 Reading Terminal, Philadelphia, Pa		June 1, 1904
Dunlap, Frederic Clark. 7821 Walker St., Holmesburg, Philadelphia, Pa		June 1, 1904
Ellsworth, Emory Alexander. 18 Dwight St., Holyoke, Mass		June 1, 1904
Emerson, Guy Carleton. Cons. Civ. Engr., 19 Grovenor Rd., Boston, Mass		May 4, 1904
Francis, Walter Joseph. Engr. of Hydr. Locks, Trent Canal, Peterborough, Ont., Canada	Assoc. M. M.	May 1, 1901 April 5, 1904
Fuller, George Warren. (Rudolph Hering & George W. Fuller, Hydr. and San. Engrs.), 170 Broadway, New York City	Assoc. M. M.	Mar. 1, 1899 May 31, 1904
Hamlin, Homer. Engr., U. S. Geological Survey, Reclamation Service, 1108 Braly Bldg., Los Angeles, Cal		May 4, 1904
Hammond, Alonzo John. City Engr., South Bend, Ind		June 1, 1904
Hemming, Duncan Wirgman. 502 West 143d St., New York City	Assoc. M. M.	Sept. 7, 1892 May 31, 1904
Honens, Frederick William. U. S. Junior Engr., U. S. Engr. Office, Sterling, Ill	Assoc. M. M.	April 3, 1901 May 31, 1904
Humphrey, Richard Lewis. Cons. Engr., 1001 Harrison Bldg., Philadelphia, Pa	Assoc. M. M.	May 5, 1897 May 3, 1904
Marshall, Robert Bradford. U. S. Geological Survey, Sacramento, Cal		May 4, 1904
Moses, John Cranch. Chf. Draftsman, The Boston Bridge Works, Inc., Cambridge, Mass.	Jun. Assoc. M. M.	July 2, 1890 May 4, 1898 May 3, 1904
Nauman, George. Union Station, Harrisburg, Pa		May 4, 1904
Palmer, John Elden. (Gow & Palmer, Civ. Engrs. and Contrs.), 50 Congress St., Boston, Mass		June 1, 1904
Reber, Henry Linton. Secy., Gen. Mgr. and Chf. Engr., Kinloch Telephone Co., St. Louis, Mo		May 4, 1904

		Date of Membership.
Sprague, Frank Julian. 20 Broad St., New York City		June 1, 1904
Suhr, Otto Bruno. Engr. in Chg., The Ontario Power Co., Niagara Falls, Ont., Canada		June 1, 1904
Swanker, John Edward. Gen. Mgr., Tees Side Bridge & Eng. Works, Ltd., Middlesbrough, England		May 4, 1904
Taylor, Benjamin Henry. Chf. Engr., Carnegie Steel Co., 323 Swissvale Ave., Edgewood Park, Pa		May 4, 1904
Thomson, Ernest Burslem. U. S. Asst. Engr., U. S. Engr. Office, Miami, Fla	Assoc. M. M.	June 5, 1901 May 31, 1904
Tighe, James Lawrence. City Engr.; Engr., Holyoke Water Works, Holyoke, Mass	Assoc. M. M.	Oct. 5, 1898 May 31, 1904
Walker, Clement Isaac. Chf. Engr., Union Subway Constr. Co., 1170 Broadway, New York City	Assoc. M. M.	April 1, 1891 May 3, 1904
Witmer, Joseph Franklin. Hydr. and San. Engr., Chapin Blk., Buffalo, N. Y		May 4, 1904

ASSOCIATE MEMBERS.

Allen, Charles Metcalf. Asst. Prof. of Experimental Eng., Worcester Poly. Inst., Worcester, Mass		June 1, 1904
Belknap, John Mansfield. Prin. Asst. Engr., West Indies Constr. Co., Box 664, San Juan, Porto Rico		May 4, 1904
Best, John Henry. U. S. Junior Engr., 1515 N. Monroe St., Peoria, Ill		June 1, 1904
Brenn, Charles Ferdinand. Red Lodge, Mont		May 4, 1904
Churchill, Percival Mitchell. U. S. Geological Survey, Chamber of Commerce Bldg., Denver, Colo		June 1, 1904
Dallis, Park Andrew. Greenville, S. C		June 1, 1904
Dillard, John Lea. Asst. Engr., N. & W. Ry., Boxley, W. Va.		June 1, 1904
Dixon, De Forest Halsted. 166 Remsen St., Brooklyn, N. Y	Jun. Assoc. M.	May 3, 1898 Feb. 3, 1904
Dunn, William Robert. 139 North 3d St., Easton, Pa.		April 6, 1904
Ferguson, James Easton. Cons. Bridge and Structural Engr., 645 Fourteenth Ave., Detroit, Mich		June 1, 1904
Foster, Mortimer. (Foster, Gade & Graham, Archts.), 281 Fourth Ave., New York City		June 1, 1904
Gow, Charles Rice. (Gow & Palmer, Civ. Engrs. and Contrs.), 25 Montview St., W. Roxbury, Mass		June 1, 1904
Hoyt, John Clayton. U. S. Geological Survey, Washington, D. C		May 4, 1904
Hubbell, George Scott. 1140 Bloomfield St., Hoboken, N. J.		June 1, 1904
Jacobs, Robert Hyde. 217 Prospect St., Westfield, N. J.		May 4, 1904
Jones, Thomas John. Supt. of Mines, Mountain Copper Co., Ltd., Iron Mt., Keswick, Cal		June 1, 1904
Lackey, Oscar Francis. El Cobre Mines, Santiago, Cuba		May 4, 1904
Lasley, Charles Orton. 4 Bronson Pl., Toledo, Ohio		May 4, 1904
MacNair, Henry James. 144 Essex St., Boston, Mass		June 1, 1904

		Date of Membership.
Madden, John Henry. Asst. Engr., Rapid Transit R. R. Comm., 308 West 30th St., New York City	Jun. Assoc. M.	Oct. 7, 1902 May 4, 1904
Manter, Ralph Barton. Care, Isthmian Canal Comm., Gatun, Canal Zone, Panama		June 1, 1904
Matheson, Ernest George. 64 West 104th St., New York City		June 1, 1904
Robinson, Harry Hayes. Asst. Engr., Maine Cent. R. R., 238 St. John St., Portland, Me		May 4, 1904
Sanborn, John Forrest. 1 St. Felix St., Brooklyn, N. Y.		May 4, 1904
Snyder, Frederick Antes. Supt , Costa Constr. Co., Summit, N. J.		June 1, 1904

ASSOCIATES.

Leather, Basil Henry. Pres., Union Constr. & Waterproofing Co., 404 St. James Bldg., New York City	June 1, 1904
Lyman, Richard Roswell. 116 Madison St., Ithaca, N. Y.	May 4, 1904
Monahan, John Joseph. 113 Devonshire St., Boston, Mass.	June 1, 1904

JUNIORS.

Babé, Joseph Manuel. First Asst. Engr., Office of Public Works, Cerro St. 440 B, Havana, Cuba	May 31, 1904
Backes, William James. 467 Third Ave., West Haven, Conn	May 31, 1904
Cornish, Lorenzo Dana. U. S. Engr. Office, Beaver, Pa.	April 5, 1904
Dicke, Edward Christian. 1909 Herbert St., St. Louis, Mo.	May 3, 1904
Greensfelder, Albert Preston. 206 Union Station, St. Louis, Mo.	May 3, 1904
Gugerty, Edward Joseph. 54 East 124th St., New York City	May 3, 1904
Haselton, Gage. 469 South Station, Boston, Mass.	May 3, 1904
Hood, John Mifflin, Jr. 238 Park Ave., Baltimore, Md.	May 31, 1904
Hunter, Leroy Littlefield. Lehi City, Utah Co., Utah	Jan. 5, 1904
Ludlow, Justin Wyman. 209 Adams St., Room 62, Chicago, Ill	April 5, 1904
McIntire, Thomas Burton. 120 Liberty St., New York City.	Mar. 1, 1904
Root, William Stanton. Office of Terminal Engr., Grand Central Palace, New York City	Oct. 6, 1903
Shelley, Oswald Procter. Cornwall, Contra Costa Co., Cal.	April 5, 1904
Sprague, Edwin Loring, Jr. Care Shawmut Machinery Co., 82 Lincoln St., Boston, Mass.	May 31, 1904

CHANGES OF ADDRESS.

MEMBERS.

Ball, Charles Backus	118 Hazel Ave., Chicago, Ill.
Bennett, Frederick Wagoner	33 West 20th St., New York City.
Binkley, George Holland	Care, Hadley Derrick Co., Talbot Bldg., Indianapolis, Ind.

Black, William Murray	Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Portland, Me.
Brown, Alba Fisk	Seventh St., Oakmont, Allegheny Co., Pa.
Brown, Baxter Lamont	Asst. Engr., Mo. Pac. Ry., Room 502 Mo. Pac. Bldg., St. Louis, Mo.
Caples, Martin Joseph	Supt., Pocahontas Div., Norfolk & West. Ry. Co., Bluefield, W. Va.
Colby, Branch Harris	Civ. and Cons. Engr., 812 Security Bldg., St. Louis, Mo.
Coleman, John Francis	Cons. Engr., 920 Hibernia Bank and Trust Bldg., New Orleans, La.
Corry, Thomas Avery	Supt. of Permanent Way, Ferrocarril, Mexicano, City of Mexico, Mexico.
Corthell, Arthur Bateman	Terminal Engr., N. Y. C. & H. R. R. R., Grand Central Palace, 43d St. and Lexington Ave., New York City.
Davis, Joseph Phineas	Cons. Engr., 1170 Broadway, New York City.
Dose, Henry Frederick	Care, Isthmian Canal Comm., Colon, Panama.
Ellis, George Ezra	Post 27, Transportation Bldg., Louisiana Purchase Exposition, St. Louis, Mo.
Fields, Samuel James	632 Ellicott St., Buffalo, N. Y.
Fitch, Asa Betts	673 Walsworth Ave., Oakland, Cal.
Frank, George William	Saranac Lake, N. Y.
Frazier, James Lewis	Gen. Mgr., California Northwestern Ry, Co., 222 Sansome St., San Francisco, Cal.
Giles, Robert	Vice-Pres. and Gen. Mgr., National Bridge Works, 1123 Broadway, New York City.
Green, Hubert Edward	Engr., U. S. Geological Survey, Div. of Hydrography, 1108 Braly Bldg., Los Angeles, Cal.
Haight, Stephen Samuel	Civ. Engr. and City Surv., 1986 West Farms Rd. (Res., Buchanan Pl., University Heights), New York City.
Hall, Benjamin Mortimer	322 Trust Bldg., El Paso, Tex.
Hanna, John Venable	Prin. Asst. Engr., Frisco System; Care, Frisco System, St. Louis, Mo.
Hurry, Edward Henry	7 St. Stephen's Mansions, Monmouth Rd., Westbourne Grove, London, W., England.
Jaques, William Henry	Engr. and Naval Archt., Little Boar's Head, N. H.
Johnson, Francis Robert	Vernon, B. C., Canada.

Kastl, Alexander Edward	Chf. Engr., The Denver Union Water Co., 973 Clarkson St., Denver, Colo.
Keith, George Thomas	Res. Engr., Barge Canal, Triangle Bldg., Rochester, N. Y.
Kennedy, James Henry	Chf. Engr., Vancouver, Victoria & East. Ry. & Nav. Co., Grand Forks, B. C., Canada.
Le Baron, John Francis	Cons. Engr., Pres., Brookside Medicinal Plantation Co., 712 Park Bldg., Cleveland, Ohio.
List, Charles	Asst. Engr., I. C. C., Colon; care, Panama R. R. Co., 24 State St., New York City.
Lyons, James Knox	Asst. Div. Engr., Am. Bridge Co., Ambridge, Pa.; Address, Elmhurst Inn, Sewickley, Pa.
McComb, Charles Oscar	Div. Engr., Middle Div., New York State Canals, Syracuse, N. Y.
Marstrand, Otto Julius	Hopetoun House, 5 Lloyd's Ave., London, E. C., England.
Michell, Theophilus	Windsor Lodge, Taunton, England.
Mogensen, Olaf Einar	Liberal Arts Bldg., St. Louis, Mo.
Montgomery, John Alexander	Cons. Engr., Room 925, First National Bank Bldg., Birmingham, Ala.
Morse, Charles Adelbert	Asst. Chf. Engr., A., T. & S. F. Ry., 827 Harrison St., Topeka, Kans.
Morse, Charles James	1825 Asbury Ave., Evanston, Ill.
Nichols, Edwin Jay	Engr., M. of W., N. Y., Tex. & Mex. Ry. Co. and Gulf, West. Tex. & Pac. Ry. Co., Victoria, Tex.
Olney, Alfred Clarence	27 Pitt St., Charleston, S. C.
Pratt, Mason Delano	18 North 3d Street, Harrisburg, Pa.
Purdy, Corydon Tyler	114 Liberty St., New York City.
Raymond, Charles Walker	Brig.-Gen., U. S. A. (*Retired*), 1 West 34th St., New York City.
Raymond, Charles Ward	1611 Larkin St., San Francisco, Cal.
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Rogge, John Charles Lewis	Pres. and Mgr., Contrs. Supply Co., Watson's Lane, Westchester, New York City.
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Sawyer, Edward	100 Bellevue St., Newton, Mass.
Sears, Alfred Francis	193½ Union Ave., N., Portland, Ore.
Shaw, Sumner Farnham	Chf. Engr., Guatemala R. R., Sanarate, Guatemala.
Sims, Alfred Varley	Wenonda, Pittsylvania Co., Va.

Sleeper, George Edward..........252 Fifty-third St., Brooklyn, N. Y.

Smith, T. Guilford..........Mgr. of Sales, Carnegie Steel Co., Pittsburg, U. S. Steel Products Export Co., N. Y., Illinois Steel Co., Chicago, 203-A Ellicott Sq., Buffalo, N. Y.

Smoot, Edgar Kenneth..........Concessionario de las obras del Puerto de Manzanillo, 2a Avenida Balderas, No. 814, City of Mexico, Mexico.

Storey, William Benson, Jr..........Chf. Engr., A., T. & S. F. Ry. Co., Topeka, Kans.

Tuttle, Arthur Smith..........Prin. Asst. Engr., Board of Estimate and Apportionment, 277 Broadway, New York City.

Waldo, Mark Albigense..........Care, Dominion Phosphate Co., Bartow, Fla.

Wallace, John Findley..........Chf. Engr., Isthmian Canal Comm., Ancon, Canal Zone, Panama.

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Wilson, Winter Lincoln..........Asst. Prof., Civ. Eng., Lehigh Univ., South Bethlehem, Pa.

Woolley, Andrew Feaster..........Cons. and Contr. Engr., Apartado 21, Tampico, Mexico.

Yeatman, Pope..........Care, A. W. Sewall, 1206 Spruce St., Philadelphia, Pa.

Young, Roscoe Cyprian..........Chf. Engr., Lake Superior & Ishpeming Ry. Co., Munising Ry. Co., Marquette & Southeastern Ry. Co., Marquette, Mich.

ASSOCIATE MEMBERS.

Allen, Henry Clayton..........Special Deputy State Engr., Barge Canal Office, DeGraaf Bldg., Albany, N. Y.

Auryansen, Frederick..........Chf. Draftsman, Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y.

Barrows, Harold Kilbreth..........49 Hammond St., Bangor, Me.

Bayliss, John Yancey..........4633 Washington Blvd., St. Louis, Mo.

Boatrite, James Edwin..........Chf. Engr., Guerber Eng. Co., W. Bethlehem (Res., 835 Broadway, S. Bethlehem), Pa.

Boyd, James Churchill..........Asst. Engr., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City.

Braune, Gustave Maurice..........Care, The State Engr., Albany, N. Y.

Burns, Justin..........1913 Amsterdam Ave., New York City.

Carlile, Thomas Jenks..........Asst. Engr., West Indies Constr. Co., P. O. Box 794, San Juan, Porto Rico.

Carpenter, Allan Wadsworth.......Engr. of Bridges, N. Y. C. & H. R. R. R., 504 Grand Central Station, New York City (Res., 90 Warring Pl., Yonkers, N. Y.).

Cole, Burt ....Chester, Ill.

Corner, Charles...................Res. Engr., Rhodesia Rys., Bulawayo, Rhodesia, South Africa.

Cowper, John Whitfield............James Stewart & Co., Contrs., 135 Broadway, New York City.

Craig, Washington Righter.........Res. Engr., Buffalo & Susquehanna Ry., Boston, Erie Co., N. Y.

Fain, James Rhea..................Hastings, Nebr.

Galbreath, William Otto...........Utica, Mo.

Garrison, Frank Lynwood. ....726 Drexel Bldg., Philadelphia, Pa.

Green, Fred May...................1 West 34th St., New York City.

Grover, Nathan Clifford...........Care, U. S. Geological Survey, Washington, D. C.

Gueringer, Louis Amedee...........Locating Engr., St. L. B. & M. Ry., Corpus Christi, Tex.

Hall, Louis Wells.................Barge Canal Office, DeGraff Bldg., Albany, N. Y.

Hammatt, William Cushing.........Montpelier, Idaho.

Hardy, Harry......................29 Maxilla Gardens, Holland Park, London, W., England.

Hartwell, Harry ....975 Park Ave., New York City.

Hilliard, Foster Haven............244 Atkinson Ave., Memphis, Tenn.

Horton, Theodore..................Res. Engr., 47 East Market St., York, Pa.

Houston, Gavin Nelson.............Dept. of Eng., State Agri. Coll., Fort Collins, Colo.

Hyde, William Herbert.............Lourdes, Nova Scotia, Canada.

Janvrin, Ned Herbert..............Asst. Engr., Am. Bridge Co., 1304 Union Trust Bldg., Cincinnati, Ohio.

Keays, Reginald Horton............592 West End Ave., New York City.

Lockwood, Willard Datus...........Res. Engr., Rochester Water-Works, Henrietta, N. Y.

Lowinson, Oscar...................Cons. Archt. and Engr., 33 West 42d St., New York City.

McCulloch, Richard................Care, St. Louis Transit Co., St. Louis, Mo.

McGee, Van Norman................3359 Goss St., Denver, Colo.

Mason, George Cotner..............251 St. Clair St., Portland, Ore.

Myers, Edward Warren........ ....U. S. Geological Survey, Malta, Mont.

Osbourn, Henry Van Buren ....1433 Euclid Ave., Philadelphia, Pa.

Paine, Hibbard Atwill.............Res. Engr., M. V. R. R., Muskogee (Creek Nation), Ind. T.

Pfeifer, Herman Julius............Gen. Supt. of Constr., Street Dept., 4234a West Bell Pl.,.St. Louis, Mo.

Phillips, Howard Crathorne ....Chf. Engr., San Fran. & N. W. Ry., Room 528, Crossley Bldg., San Francisco, Cal.

Rights, Lewis Daniel..............Contr. Engr. in Chg. of Eastern Office of Louis F. Shoemaker & Co., 902 Chapel St., New Haven, Conn.

Robbins, Allan Appleton............Res. Engr., N. Y. & L. I. R. R., 1 East 42d St., New York City.

Schaeffer, Amos ....42 South Maple Ave., East Orange, N. J.

Schwiers, Frederick William.......208 West 104th St., New York City.

Shellenberger, Leidy Rudy.........2905 Fourteenth St., N. W., Washington, D. C.

Smith, Lloyd Bown..................Engr., Topeka Bridge & Iron Mfg. Co., Topeka, Kans.

Stenger, Ernest.....................Asst. Engr., U. P. R. R., 809 West First St., Grand Island, Nebr.

Stickney, George Fetter ....316 West 84th St., New York City.

Stratton, George Draper...........Asst. Engr., Western Div., S. P. R. R., 946 Chestnut St., Oakland, Cal.

Strawn, Thomas Corwin ....P. O. Box 374, Lynchburg, Va.

Strickler, Gratz Brown ....Supt. of Construction, U. S. Public Bldgs , in chg. of erection of Custom House (new), Baltimore, Md.

Sumner, Robert Swan...............Chf. Engr., C. & N. W. Ry., Boulder, Colo.

Todd, Alexander Miller ....U. S. Asst. Engr., P. O. Box 204, Memphis, Tenn.

Tompkins, Edward De Voe ....Mgr., Phila. Office, Columbian Fireproofing Co., Real Estate Trust Bldg., Philadelphia, Pa.

Ulrich, Daniel.....................269 West 136th St., New York City.

Van Pelt, Sutton ....Care, U. S. Engr. Office, Sawyerville, Ala.

Venable, William Mayo ....Planters Hotel, Leavenworth, Kans.

Watson, Irvine ....Gen. Supt. of Constr., Trussed Concrete Steel Co., 306 Union Trust Bldg., Detroit, Mich.

Watson, Walter.....................Salem, Va.

Wentworth, Charles Austin ....Civ. Engr., U. S. N., Naval Station, Guantanamo Bay, Cuba, Care, Postmaster, New York City.

Wheeler, Ralph Norman ....Engr., T. A. Gillespie Co., 71 Broadway, New York City.

Whipple, George Chandler.........(Hazen & Whipple, Cons. Engrs.), 220 Broadway, New York City.

White, Lazarus ....Asst. Engr., Rapid Transit R.R. Comm., 4 Court Sq. (Res., 450 St. Johns Pl.), Brooklyn, N. Y.

WIGGIN, THOMAS HOLLIS .... Div. Engr., Bureau of Filtration, Cor. Bryant and St. Clair Sts., Pittsburg, Pa.
WILKERSON, THOMAS JEFFERSON........ Apartment No. 109, Buckingham, Pittsburg, Pa.
WILLIAMS, CHARLES PAGE .... Engr., Reclamation Service, Cody, Wyo.
WILLS, ARTHUR JOHN .... 2881 Woodbrook Ave., Baltimore, Md.
WOODARD, WILKIE.................... Care, Cincinnati Union Terminal Ry. Co., Room 732, Union Trust Bldg., Cincinnati, Ohio.
YOUNG, EDDY ELBERT................ 86 Islington Rd., Auburndale, Mass.

JUNIORS.

BEEKMAN, JOHN VAN DERVEER, Jr...... Mgr., Boston Office, Purdy & Henderson, 913 Paddock Bldg., Boston, Mass.
BELZNER, THEODORE.................. Insp., Steel Constr., East Side Viaduct, Rapid Transit R. R. Comm., Div. 4, Sec. 10, 301 West 150th St., New York City.
BRASLOW, BARNETT................... With Thompson-Starrett Co., 51 Wall St. (Res., 73 West 115th St.), New York City.
BRINKLEY, MILO HAMILTON............ Box 452, Ballard, Wash.
BRISLEY, EDWARD BETTS.............. 3 West 104th St., New York City.
DAVIS, GEORGE JACOB, Jr............. Hydr. and San. Engr., 199 Lyon St., Grand Rapids, Mich.
DIAMANT, ARTHUR HERBERT........... Asst. to Div. Engr., Aqueduct Div., Aqueduct Commrs. (Res., 531 West 124th St.), New York City.
FORBES, HENRY DE BRETTON........... Engr., H. E. Talbott & Co., College Hill, Ky.
HARRIS, HENRY ALEXANDER............ Care, Isthmian Canal Comm., Panama R. R. & S. S. Co., 24 State St., New York City.
HOLLIDAY, ALEXANDER RIEMAN......... Engr., M. of W., Penn. Co., Union Station, Indianapolis, Ind.
HOW, RICHARD WILLIS................ Asst. Engr., Steel Erection, Atlantic Ave. Impvt., 5 Hanson Pl., Brooklyn, N. Y.
IRELAND, MARK LORIN................ 2d Lieut., 11th U. S. Infantry, Fort Sheridan, Ill.
KOLB, HENRY JACOB.................. Chf. Draftsman, Office of Engr. of Way and Structure, Brooklyn Heights R. R. Co., 168 Montague St., Brooklyn, N. Y.
LINDSEY, KIEFFER.................... Crystal Springs, Ga.
McCRORY, SOL....................... Box 477, Cleburne, Tex.

Matheson, John Douglas............Insp. of New Constr., N. Y. C. & H. R. R. Co., Terminal Engr.'s Office, Grand Central Palace, 43d St. and Lexington Ave., New York City.
Miner, James Henry................Asst. Engr., U. S. Reclamation Service, Montrose, Colo.
Moore, Egbert Jessup..............137 West 90th St., New York City.
O'Connor, Cornelius Joseph........1799 Washington Ave., Bronx, New York City.
Plogsted, Walter John............929 Sixtieth St., Oakland, Cal.
Potts, Clyde ....902 Whitehall Bldg., New York City.
Price, Philip Wallis...............Care, U. S. Geological Survey, 427 Peyton Blk., Spokane, Wash.
Roberts, Harry Ashton.............Care, O. S. L. R. R., Pocatello, Idaho.
Rohnert, Benno....................85 Champlain St., Detroit, Mich.
Runyon, William Kerper...........111 Central Ave., Newark, N. J.
Senior, Frank Sears...............With McMullen & McDermott, Havre de Grace, Md.
Shyrock, Joseph Grundy...........Care, Belmont Iron Works, Philadelphia, Pa.
Smith, Travis Logan, Jr..... ......City Engr., Eagle Lake, Tex.
Snyder, Charles Herman............City Engr., Oswego, N. Y.
Taft, Jesse Russell ....Asst. Engr., N. Y. C. & H. R. R. R., 23 East 48th St., New York City.
Wilcox, Clark Luzerne...........228 Third St., Aspinwall, Pa.
Wyckoff, Charles Rapelyea, Jr ...185 Penn St., Brooklyn, N. Y.
Yen, Tuck Ching Strong............Res. Engr., Canton-Hankow, Ry., Canton, China.

FELLOWS.

Adams, Edward Dean.... ....Banker, 71 Broadway, Offices 1414-15, New York City.

RESIGNATIONS.

	Date of Resignation.
Pratt, Robert James....................................	May 31, 1904

DEATHS.

Barr, Jacob Neff..................Elected Member, November 7th, 1888; died May 15th, 1904.
McCalla, Richard Calvin...........Elected Member, December 5th, 1894; died June 13th, 1904.
McKeown, Thomas..................Elected Member, December 3d, 1879; died June 7th, 1904.
Tingley, George Curtis.............Elected Member, September 6th, 1871; died April 30th, 1904.
Tullock, Alonzo J ....Elected Member, June 6th, 1883; died July 21st, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(May 11th to August 3d, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.

(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.

(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.

(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.

(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.

(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.

(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.

(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.

(9) *Engineering Magazine*, New York City, 25c.

(10) *Cassier's Magazine*, New York City, 25c.

(11) *Engineering* (London), W. H. Wiley, New York City, 25c.

(12) *The Engineer* (London), International News Co., New York City, 35c.

(13) *Engineering News*, New York City, 15c.

(14) *The Engineering Record*, New York City, 12c.

(15) *Railroad Gazette*, New York City, 10c.

(16) *Engineering and Mining Journal*, New York City, 15c.

(17) *Street Railway Journal*, New York City, 35c.

(18) *Railway and Engineering Review*, Chicago, Ill., 10c.

(19) *Scientific American Supplement*, New York City, 10c.

(20) *Iron Age*, New York City, 10c.

(21) *Railway Engineer*, London, England, 25c.

(22) *Iron and Coal Trades Review*, London, England, 25c.

(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.

(24) *American Gas Light Journal*, New York City, 10c.

(25) *American Engineer*, New York City, 20c.

(26) *Electrical Review*, London, England.

(27) *Electrical World and Engineer*, New York City, 10c.

(28) *Journal*, New England Water-Works Assoc., Boston, $1.

(29) *Journal*, Society of Arts, London, England, 15c.

(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.

(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.

(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.

(33) *Le Génie Civil*, Paris, France.

(34) *Portefeuille Économique des Machines*, Paris, France.

(35) *Nouvelles Annales de la Construction*, Paris, France.

(36) *La Revue Technique*, Paris, France.

(37) *Revue de Mécanique*, Paris, France.

(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.

(39) *Railway Master Mechanic*, Chicago, Ill., 10c.

(40) *Railway Age*, Chicago, Ill., 10c.

(41) *Modern Machinery*, Chicago, Ill., 10c.

(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.

(43) *Annales des Ponts et Chaussées*, Paris, France.

(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.

(45) *Mines and Minerals*, Scranton, Pa., 20c.

(46) *Scientific American*, New York City, 8c.

(47) *Mechanical Engineer*, Manchester, England.

(54) *Transactions*, Am. Soc. C. E., New York City, $5.

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(57) *Colliery Guardian*, London, England.

(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.

(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.

(60) *Municipal Engineering*, Indianapolis, Ind., 25c.

(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.

(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.

(63) *Minutes of Proceedings*, Inst. C. E., London, England.

(64) *Power*, New York City, 20c.

(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.

(66) *Journal of Gas Lighting*, London, England, 15c.

(67) *Cement and Engineering News*, Chicago, Ill., 25c.

(68) *Mining Journal*, London, England.

(69) *Mill Owners*, New York City, 10c.

(70) *Engineering Review*, New York City, 10c.

(71) *Journal*, Iron and Steel Inst., London, England

(72) *Street Railway Review*, Chicago, 30c.

(73) *Electrician*, London, England, 18c.

(74) *Transactions*, Inst. of Min. and Metal., London, England.

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Steam Pipe Coverings. S. H. Davies. (From *Journal* of the Soc. of Chem. Industry.) (47) June 4.
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A New System for Three-High Plate Mills.* (22) June 10.
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Greasy Condensation Water as Boiler Feed.* William Paterson. (Paper read before the Junior Inst. of Engrs.) (**47**) Serial beginning July 23.

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A New Electrical Process of Manufacturing Peat Fuel. (**19**) Aug. 6.

Le Carburateur Claudel, Précédé d'une Théorie Générale sur la Carburation.* H. Claudel. (**32**) Mar.

Étude sur la Production de la Vapeur.* A. Lencanchez. (**32**) Mar.

La Turbine à Vapeur du Système Rateau et Ses Applications.* J. Rey. (**32**) Apr.

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The Kepp Metallurgical Furnace.* (**20**) May 19.

Amalgamation on the Rand. I. Roskelley. (From the *Journal* of the Chem Metal. and Min. Soc. of S. Africa.) (**16**) May 26.

Cyaniding Gold-Bearing Sulphurets. S. B. Christy. (Paper read before the California Miner's Assoc.) (**45**) June.

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The Application of Coal-Cutting Machines to Deep Mining.* W. E. Garforth, M. Inst. C. E. (Paper read before the National Assoc. of Colliery Managers.) (**22**) May 6.
The Coal and Iron Resources of the Dominion of Canada.* (**22**) May 6.
A Gravity Incline at the Antonio Mine in Cuba.* E. M. Holmes. (**13**) May 12.
Electric Winding. Gerald Hooghwinkel. (**22**) May 13.
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Methods of Working Coal in the Rhenish Westphalian Basin.* Maurice Bodart. (Abstract from *Report* in "Annuaire de l'Association des Ingénieurs Sortis de l'Ecole de Liége." Vol. XVII.) (**22**) May 27.
Electric Power in European Collieries.* C. S. Vesey Brown, M. Inst. C. E. (**10**) June.
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Prevention of Accidents in Winding.* J. H. Merivale. (Paper read before the Inst Min. Engrs.) (**57**) June 17; Abstract (**22**) June 17; (**26**) June 17.
Electric and Compressed Air Locomotives for Mines. Beverley S. Randolph. (Paper read before the Inst. Min. Engrs.) (**57**) June 17; Abstract (**22**) June 3.
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Deep Hoisting in South Africa.* J. S. Lane. (**45**) July.
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City Gas Inspection and Inspectors. Ira C. Copley. (Paper read before the Congress of Gas Associations of America.) (**24**) Serial beginning Aug. 1.
Le Goudronnage des Routes.* G. Espitallier. (**33**) May 14.

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The Location of the Knoxville, La Follette and Jellico Railroad, of the Louisville and Nashville System.* W. D. Taylor, M. Am. Soc. C. E. (**54**) Vol. 52.
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Standard Location of Third Rail for Electrical Operation.* (Report of Com. to the Master Car Builders' Assoc.) (**18**) July 2; (**15**) June 24; (**17**) June 25.
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Method of Making Electrical Survey of Rochester, N. Y.* (60) June.
An Important Test of Elliptic Springs: Made for the Interborough Rapid Transit Railway: To Determine Permanent Set and Proper Working Fiber Stress.* S. A. Bullock. (25) June.
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A Description of Sewage Disposal Systems in Massachusetts.* X. Henry Goodnough. (Paper read before the Boston Soc. of Civ. Engrs.) (1) May.
Adaptability of the Massachusetts Method of Intermittent Sand Filtration to Sewage Disposal Problems in Other States.* F. Herbert Snow. (Paper read before the Boston Soc. of Civ. Engrs.) (1) May.
The Use of the Septic Tank in Connection with Sewage Disposal Works. Frank A. Barbour. (Paper read before the Boston Soc. of Civ. Engrs.) (1) May.
Heating the Greenhouse at the United States Soldiers' Home, Washington, D. C.* (70) May.
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An Investigation of Hub Joints in Cast Iron Pipes.* George Mathias Trede. (70) May.
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Sewer Contractor's Records. (13) May 19.
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Tenement House Problems. Thomas C. T. Crain. (70) June.
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Advanced Methods of Warm Air Heating.* A. C. Jones. (Paper read before the Amer. Soc. of Heating and Ventilating Engrs.) (70) July; Abstract (14) July 23.
Air Quantity Required for Ventilation.* S. H. Woodbridge. (Abstract of Paper read before the Conn. State Board of Education.) (70) Serial beginning July.
A Central Hot-Water Heating Plant in the Boston Navy Yard.* (14) July 16.
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Theory of the Spherical Dome with a Homogeneous Surface, and of the Framed Dome; also Notes on the Construction of Masonry and Metal Domes.* E. Schmitt, Assoc. M. Am. Soc. C. E. (54) Vol. 52.
Roofing Existing Shops While Work is Proceeding.* R. H. Fowler, M. I. Mech. E. (75) No. 2, 1903.
Report to the Chief of Engineers, U. S. A., on the Baltimore Fire. John Stephen Sewel. (67) Apr.
Timber Treatment and Timber Treating Plants.* Walter W. Curtis. (65) Apr. 15.
Tests of Sand Lime and Concrete Lime Brick and Concrete Building Blocks. A. Marston. (Paper read before the Iowa Brick and Tile Assoc.) (76) May.
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An All-Concrete Grand-Stand.* J. L. Van Ornum. (14) May 28.
The Design of the Steel-Concrete Work of the Harvard Stadium.* Lewis J. Johnson. (Paper read before the Boston Soc. of Civ. Engrs.) (1) June; (14) July 23.
Report of the Committee on Technical Investigation: The Formation of Dark Cores or Discolorations in the Interior of Claywares. Edward Orton. (76) June.
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Cross-Bending Tests on Beams of Reinforced Concrete.* Malverd A. Howe. (4) June.
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The Preservative Treatment of Wood.* Samuel P. Sadtler. (7) June.
Contributions to Our Knowledge of White Lead and of Its Protecting Properties. Augustus H. Gill and Stanley A. Foster. (7) June.
The Recent Conflagration in Baltimore.* C. L. Norton. (7) June.
A Descriptive Catalogue of the Building Stones of Boston and Vicinity. W. O. Crosby and G. F. Loughlin. (7) June.
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A New Chuck for Holding Short Test Pieces.* (20) June 30.
Results of an Investigation of the Durability of Paints for the Protection of Structural Work.* Robert Job. (Paper read before the Franklin Institute.) (3) July.
Prussian Regulations for Reinforced Concrete in Building Construction. (14) July 2.
Some Notes on the Boiling Test of Cement. Frederick H. Lewis. (Paper read before the Amer. Soc. for Testing Materials.) (14) July 2.
Reinforced Concrete Construction in a Factory Extension at Bayonne, N. J.* (14) July 2.
The Seventy-first Regiment Armory Building, New York.* (14) July 2.
The Early Use of 60 000 Pound Steel. Samuel Tobias Wagner, M. Am. Soc. C. E. (Paper read before the Amer. Soc. for Testing Materials.) (20) July 7.
The Strength of Flat Plates, with an Application to Concrete-Steel Floor Panels.* (13) July 7.
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Forms for Concrete Work.* G. R. Wadsworth. (15) July 8.
Taking Down and Re-erecting the Ferris Wheel.* (14) July 9.
Tests of Steel-Concrete Beams.* Edgar Marburg. (Paper read before the Amer. Soc. for Testing Materials.) (14) July 9.
Some Details of Fire Resisting Construction. John R. Freeman. (Abstract of address before the National Board of Fire Underwriters.) (13) July 14; (14) July 30.
Results of an Investigation of Certain Structural Paints. Robert Job. (Paper read before the Amer. Soc. for Testing Materials.) (14) July 16.

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* Illustrated.

Structural—(Continued).

Underpinning a High Wall with Steel Cantilever Girders.* (14) July 16.
A Plant for the Manufacture of Concrete Blocks for Buildings.* (13) July 21.
Some Formulas and Tables for Bin Designing.* R. W. Dull. (13) July 21.
The Coal Storage and Coal Handling Plant at the New York Navy Yard.* Jos. S. Shultz. (13) July 21.
The Mechanical Plant of the Hotel Astor, New York City: The Power and Refrigerating Plant in the Latest Great Hotel.* (14) July 23.
The Use of Inferior Timbers for Structural Purposes. Hermann von Schrenk. (Abstract of Paper read before the National Lumber Manufacturers' Assoc.) (13) July 28.
Reinforced Concrete Construction in a Commercial Sand Plant.* (14) Serial beginning July 30.
The Fallacy of the Tests Ordinarily Applied to Portland Cement. Richard K. Meade. (Read at the Lehigh Valley Section of the Amer. Chem. Soc.) (19) July 30.
Note sur le Matage des Joints de Clavage dans les Voutes en Maçonnerie.* M. Tourtay. (43) 1^{e} Trimestre, 1904.
Maison de Commerce et de Rapport au Kremlin-Bicêtre (Seine).* (35) June.
Calcul d'un Plancher à Poutres et Poutrelles Associées.* E. Thuasne. (35) June.
Poutre en Béton Armé: Système H. Henkel.* Maurice Thibaut. (30) June.
Etude des Conditions de Prise du Platre.* Louis Perin. (33) June 4.
Emploi des Sables Argileux pour la Fabrication du Béton. (33) June 18.

Topographical.

Recent Methods of Hydrographic Surveying.* A. S. Cooper. (13) May 19.
Steel Tape Measurements on the Massachusetts Boundary Line, 1886 to 1898.* N. Spofford. (14) July 16.

Water Supply.

South African Irrigation. Francis Robert Johnson, M. Am. Soc. C. E. (54) Vol. 52.
An Inquiry into the Working of Various Water-Softeners.* C. E. Stromeyer, M. I. Mech. E., and W. B. Baron, M. I. Mech. E. (75) No. 4, 1903.
Deep Well Pumping Machinery.* W. Percy Gauvain, M. I. Mech. E. (75) No. 5, 1903.
Softening and Purification of Water. J. C. W. Greth. (58) Feb.
The Waterworks at St. Louis.* (12) May 13.
A Meter Plant with Automatic Metered By-Pass.* (14) May 14.
Water Consumption at Pittsburg and the Probable Effect of Metering. (14) May 14.
The Premier Proportional Displacement Water Meter.* (13) May 19; (14) May 21.
A Water Tank-Tower and Its Collapse. (13) May 19.
Important Considerations in the Designing of Large Aqueducts. (14) May 21.
A Mechanical Filtration Plant for Watertown, New York.* (14) Serial beginning May 21.
Some Recent Pumping Engine Tests.* Frank A. Whitten. (13) May 26.
The Antwerp Water Works.* (11) Serial beginning May 27.
The Largest Electric Water Power Station in New Hampshire.* (27) Serial beginning May 28.
The Garvin's Falls Dam and Canal.* (14) May 18.
Air-Lift Pumping Machinery at the Inverted Siphon of the New Croton Aqueduct, New York City.* (14) May 28.
Report on the Measurement, Consumption and Waste of Water Supplied to the Metropolitan Water District.* Dexter Brackett. (28) June.
Some Notes on Cost of Waterproofing the Concrete Lining of Reservoirs. W. C. Hawley. (28) June.
The Detection and Prevention of Water Waste at Marion, Ohio. Edward H. Cowan. (28) June.
Thawing Frozen Service Pipes by Electricity.* Frank A. McInnes. (28) June.
The Life of Cast Iron Pipe. C. Cavallier. (28) June.
Rates for Metered Water: Topical Discussion. (28) June.
Tests of De Laval Steam Turbine Centrifugal Pumps. (64) June.
The Turbine Centrifugal Pump.* (64) June.
Strainers.* W. E. Crane. (64) June.
Fire Protection for Factories: How Its Value Shall Be Determined and Who Shall Pay for It. J. H. Purdy. (28) June.
Report of Committee on Private Fire Protection.* (28) June.
Hydro-Electric Power Development at and near Joliet, Ill., Using Chicago Drainage Canal Water. Thos. T. Johnston. (4) June.
Some Tests of High-Speed Centrifugal Pumps.* (13) June 2.
The Water Supply System of St. Louis.* W. E. Rolfe. (14) June 4.
Hudson River Power in the General Electric Works.* (27) June 11.
Round Hill Dam, Spring Brook, Pennsylvania.* Marshall O. Leighton. (14) June 11.
Papers on Meters, Growths in Pipes and Private Fire Systems before the American Water Works Association. (14) June 11.
Effect of Meters, New Storage Reservoir and Yield of Watershed, Newark Water Works.* (14) June 11.
Government Irrigation Works.* Guy E. Mitchell. (19) June 11.
Water Service at the Baltimore Fire. Alfred M. Quick. (Abstract of Paper read before the Amer. Water-Works Assoc.) (14) June 11.

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* Illustrated.

Water Supply—(Continued).

Modifications of the Plan of the New Croton Dam.* William R. Hill, M. Am. Soc. C. E. (Paper read before the Amer. Water-Works Assoc.) (13) June 16.
The Meter System in Cleveland.* (13) June 16.
High-Speed Motor-Driven Pump.* (15) June 17; (18) June 18.
Bear River Power Plant and Utah Transmission Systems.* (27) Serial beginning June 18.
Repairs and Reconstruction on the Old Croton Aqueduct.* (14) June 18.
Report of the Committee of the American Water Works Association on Standard for Water Rates. (14) June 18.
Tests of a Thirty-Inch Premier Meter, and the Testing Plant of the National Meter Company. (14) June 18.
The treatment of Moorland Water to Prevent Action upon Lead Pipes.* C. Clemesha Smith, M. Inst. C. E., and E. M. Chaplin. (Abstract of Paper read before the British Water-Works Assoc.) (13) June 23.
The Use of Hoisting Engines for Loading Wheeled Scrapers on the Goulburn-Warango Water-Works, Victoria, Australia. G. H. Dunlop. (13) June 23.
Water Softening on the Southern Pacific.* H. Stillman. (15) June 24.
Water Softening on the Union Pacific. A. K. Shurtleff. (15) June 24.
The Quittacas Pumping Station and Other Features of the New Bedford Water Works.* (14) June 25.
Concrete Work on the Washington Filtration Plant. E. D. Hardy. (14) June 25.
Water Supply of Worcester, Mass.* F. A. McClure. (60) July.
The Lower Roxborough Preliminary Filters.* P. J. A. Maignen. (2) July.
Failure of Oakford Park Dam Across Brush Creek Near Jeannette, Pennsylvania.* Harrison Souder. (2) July.
To Meter or Not to Meter. J. de Bruyn Kops.* (60) July; (14) July 9.
Removal of Anabaena from Reservoir Water. (14) July 2.
Open Slow Sand Filters at Yonkers, N. Y.* (14) July 2.
An Unusual Water-Power Plant at Kykkelsrud, Norway.* (14) July 2.
Reagent Feeding Device for Water Softening.* (18) July 2.
Rubble Concrete Dam for the Atlanta Water and Electric Power Co.* (13) July 7.
Pumping Engines at Hinksford.* (12) July 8.
Concrete Work on the New Croton Dam Extension.* (14) July 9.
Concrete and Puddle for Reservoir Embankments.* Wm. Watts, Assoc. M. Inst. C. E. (Abstract of Paper read before the British Assoc. of Water-Works Engrs.) (14) July 9.
The Copper Sulphate Treatment for Algae at Elmira, N. Y. James M. Caird. (13) July 14.
A Simple Sand Washer.* F. H. Stephenson. (13) July 14.
The Ancient Water-Tanks of Aden, Arabia.* Arthur Stanley Riggs. (13) July 14.
The Chesuncook Timber Dam.* J. W. Tower. (14) July 16.
The Kern River Company's Hydro-Electric Power Enterprise.* Burr Bassell, M. Am. Soc. C. E. (13) July 21.
Foaming Waters and Scaling Waters for Locomotive Boilers. M. E. Wells. (From *Nebraska Engineering.*) (13) July 21.
Walter Filters for Railroad Use.* (15) July 22.
Birmingham's New Water Supply.* (11) July 22; (12) July 22.
Jerome Park Reservoir Gatehouses and Concrete Lining.* (14) Serial beginning July 23.
Concrete dam and Wood-Stave Conduit for Lynchburg Water-Works.* (14) Serial beginning July 23.
The Catawba River Power Development near Rock Hill, S. C.* C. A. Mees. (14) Serial beginning July 23.
Developing a Water Power: Elements of Financial and Commercial Success. Thorburn Reid. (10) Aug.
A Notable Mexican Hydro-Electric Plant.* Robert McF. Doble. (9) Aug.
Note sur l'État Instable et les Changements de Forme de Certaines Veines Liquides. M. Bazin. (43) 1e Trimestre, 1904.
L'Adhérence des Pilots de Fondation au Plateau de Béton Qui les Coiffe.* E. Roussel. (30) Apr.
Méthode Chimique pour la Mesure du Débit des conduites d'eau.* F. van Iterson. (33) Apr. 30.
Appareils a Sextuple Effet pour la Production Économique de l'Eau Distillée à Souakim (Égypte). P. Raulin. (33) May 7.
Les Nouvelles Méthodes d'Etudes des Eaux Destinées a l'Alimentation des Villes. Felix Marboutin. (36) Serial beginning May 10.
Projet d' Avenir pour l'Alimentation en Eau de New York. Ed. Imbeaux. (36) July 10.

Waterways.

The Breakwater at Buffalo, New York.* Emile Low, M. Am. Soc. C. E. (54) Vol. 52.
A Desirable Method of Dredging Channels Through River Bars.* S. P. Maximoff, Assoc. M. Am. Soc. C. E. (54) Vol. 52.
Dock Improvements at Liverpool.* George Cecil Kenyon, Assoc. M. Am. Soc. C. E. (54) Vol. 52.
The Mile Rock Steel and Concrete Light-House, California.* (14) May 14.

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* Illustrated.

Waterways—(Continued).

Concrete Steel Cribwork Wharf Construction at Depot Harbor, Ontario.* (**13**) May 26.
Boring Sounding Holes Through Ice.* (**13**) May 26.
Ferro Concrete Lighthouse.* (**12**) May 27.
The New Ship Canal at South Buffalo.* (**15**) May 27.
Mile Rock Lighthouse, San Francisco Bay. (**13**) June 16.
The Dredger *Marquess*.* (**46** June 18.
The Thames Conservancy. (**12**) June 24.
Lowering the Chicago Tunnels. O. H. Ernst. (**14**) June 25.
The Southampton Docks and Cold Storage Plant of the London & Southwestern Railway.* (**40**) July 1.
Folkestone New Pier and Harbour Works.* (**11**) July 8.
Natural Conditions Affecting the Construction of the Panama Canal. Henry L. Abbot. (**9**) Aug.
Note sur les Travaux de Réfection des Têtes des Formes de Radcub Nos. 1 et 2 du Port de Dunkerque. M. Lahaussois. (**43**) 1e Trimestre, 1904.
Notice sur les Siphons du Tréport.* M. Herzog. (**43**) 1e Trimestre, 1904.
Les Installations Maritimes de Bruxelles: Les Murs de Quai et de Soutenement.* J. Ravaillon. (**30**) Apr.
Le Dock Flottant a Transfert de Barcelone.* Daniel Bellet. (**36**) May 10.
L'Écluse Maritime du Port de Zeebrugge.* Ch. Piens. (**30**) June.
Le Port de Valparaiso: Projets d'Amélioration et d'agrandissement.* Ch. Dantin. (**33**) July 16.

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* Illustrated.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 7.

SEPTEMBER, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that
the full title of Paper, name of Author, page reference, and date
of presentation to the Society, are given.

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Papers and Discussions...........Pages 673 to 738.

NEW YORK 1904.

Entered according to Act of Congress, by the AMERICAN SOCIETY OF CIVIL ENGINEERS
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American Society of Civil Engineers.

OFFICERS FOR 1904.

President, CHARLES HERMANY.

Vice-Presidents.

Term expires January, 1905:	*Term expires January, 1906:*
L. F. G. BOUSCAREN,	F. S. CURTIS,
JAMES D. SCHUYLER.	S. L. F. DEYO.

Secretary, CHARLES WARREN HUNT.

Treasurer, JOSEPH M. KNAP.

Directors.

Term expires January, 1905:	*Term expires January, 1906:*	*Term expires January, 1907:*
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GEORGE H. PEGRAM,	JOSEPH O. OSGOOD,	NELSON P. LEWIS,
WILLIAM J. WILGUS,	GEORGE S. DAVISON,	JOHN W. ELLIS,
WILLIAM JACKSON,	E. C. LEWIS,	GEORGE S. WEBSTER,
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JAMES L. FRAZIER.	ELWOOD MEAD.	CHARLES D. MARX.

Assistant Secretary, T. J. McMINN.

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THE PRESIDENT OF THE SOCIETY IS *ex-officio* MEMBER OF ALL COMMITTEES.

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◆

The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER, - - - 533 Columbus.
CABLE ADDRESS, - - - - "Ceas, New York."

Vol. XXX. SEPTEMBER, 1904. No. 7.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

September 7th, 1904.—The meeting was called to order at 8.45 P. M.: C. C. Schneider, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 96 members and 21 guests.

The minutes of the meeting of June 1st, 1904, were approved as printed in the *Proceedings* for August, 1904.

A paper, entitled "The Installation of a Pneumatic Pumping Plant," by Arthur H. Diamant, Jun. Am. Soc. C. E., was presented by the author. A written communication from Elmo G. Harris, M. Am. Soc. C. E., was presented by the Secretary, and the subject was discussed by Edward Wegmann, M. Am. Soc. C. E., who illustrated his remarks with lantern slides.

A second paper, entitled "Some Notes on the Creeping of Rails," by Samuel Tobias Wagner, M. Am. Soc. C. E., was presented by the author. Written discussions on this paper, by Messrs. Gustav Lindenthal, W. M. Camp, F. S. Stevens, Hunter McDonald and P. H. Dudley, were presented by the Secretary.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

Fred Walter Abbott, Philadelphia, Pa.
Albert Morrill Blodgett, Kansas City, Mo.
Samuel Dunlap Brady, Parkersburg, W. Va.
David Coe, Rincon Antonio, Oaxaca, Mexico.
Frederick Reginald French, Santa Barbara, Cal.
Harry Fuller, Cleveland, Ohio.
Clarence Thomas Johnston, Cheyenne, Wyo.
Ernest William Moir, London, England.
Paul N Nunn, Niagara Falls, N. Y.
Carl Redlich, Vienna, Austria.
Wallace Berkley Riegner, Philadelphia, Pa.
Glenn Mason Scofield, Philadelphia, Pa.

As Associate Members.

George Henry Bliss, North Yakima, Wash.
George William Booth, Weston, Mass.
Sherman Worcester Bowen, St. Louis, Mo.
Benjamin Thomas Buffinton, Fall River, Mass.
Edward Smith Cole, Upper Montclair, N. J.
Guy Whitmore Culgin, New York City.
Robert Hawxhurst, Jr., Hilo, Hawaii.
John Augustus Hiller, Cincinnati, Ohio.
Ernest Avery Lamb, Albany, N. Y.
Thomas Monahan Lavelle, Ambridge, Pa.
George Frederick Lovett, Berlin, N. H.
Robert Austen McCulloch, New York City.
Harry Sherwood Royden McCurdy, Boston, Mass.
Henry Gorton Opdycke, New York City.
Walter Woodbury Patch, South Framingham, Mass.
Clarence Hard Thompson, Syracuse, N. Y.
Constantine Borisson Voynow, Philadelphia, Pa.
Parley Lycurgus Williams, Jr., Bingham, Utah.

As Associate.

John Alexander Dailey, Topeka, Kans.

The Secretary made the following announcements:

The transfer of the following candidates, by the Board of Direction, on September 6th, 1904:

FROM ASSOCIATE MEMBER TO MEMBER.

CHARLES AMES ALDEN, Steelton, Pa.
WILLIAM ANDREW ALLEN, New York City.
JAMES HENRY BRACE, New York City.
JOHN THOMPSON EASTWOOD, New Orleans, La.
RUTGER BLEECKER GREEN, Detroit, Mich.
VAN ALEN HARRIS, San Juan, Porto Rico.
ROBERT HOFFMANN, Cleveland, Ohio.
ALLAN APPLETON ROBBINS, New York City.
OSCAR EMIL STREHLOW, South Bend, Ind.

The election of the following candidates, by the Board of Direction, on September 6th, 1904:

AS JUNIORS.

NATHANIEL TOWNSEND BLACKBURN, Galveston, Tex.
CHARLES TARBELL DUDLEY, San Francisco, Cal.
ARTHUR ROBERT EITZEN, Columbia, Mo.
HENRY HEYWOOD FOX, Cambridge, Mass.
ROBERT ELLIOT HALL, Auburn, N. Y.
JOHN HAWKESWORTH, New York City.
FRAZER CROSWELL HILDER, Washington, D. C.
CLEMENT JOHN HOWARD, Galveston, Tex.
JACOB BACON HUTCHINGS, Jr., Louisville, Ky.
LUTHER ELMAN JOHNSON, Lawton, Okla.
GUSTAVE EDMUND KAHN, Milwaukee, Wis.
FRANK CECIL MAGRUDER, Belle Fourche, S. Dak.
FRANK LESLIE WILCOX, St. Louis, Mo.

The Secretary announced the following deaths:

GEORGE CURTIS TINGLEY, elected Member, September 6th, 1871; died April 30th, 1904.

THOMAS MCKEOWN, elected Member, December 3d, 1879; died June 7th, 1904.

RICHARD CALVIN MCCALLA, elected Junior, July 2d, 1890; Associate Member, September 2d, 1891; Member, December 5th, 1894; died June 13th, 1904.

ALONZO J. TULLOCK, elected Member, June 6th, 1883; died July 21st, 1904.

JOSEPH NORTON GREENE, elected Member, October 5th, 1887; died August 10th, 1904.

George Clinton Gardner, elected Member, November 3d, 1875; died August 12th, 1904.

Fritz Carl Anders Georg Bergengren, elected Associate Member, December 2d, 1896; died August 8th, 1904.

The Secretary announced the details of the entertainment of the visiting Members of the Institution of Civil Engineers to be held from September 13th to 16th, 1904.

Adjourned.

September 21st, 1904.—The meeting was called to order at 8.40 p. m., George H. Pegram, Director, in the chair; Chas. Warren Hunt, Secretary, and present, also, 135 members and 46 guests.

Three papers were presented for discussion: The first, entitled "General Methods for the Calculation of Statically Indeterminate Bridges, as used in the Check Calculations of Designs for the Manhattan Bridge and the Blackwell's Island Bridge, New York," by Frank H. Cilley, S. B., was presented by the author. The second paper, entitled "Theory and Formulas for the Analytical Computation of a Three-Span Suspension Bridge with Braced Cable," by Leon S. Moisseiff, Assoc. M. Am. Soc. C. E., was presented by the author, and a written discussion by I. P. Church, Assoc. Am. Soc. C. E., was read by title by the Secretary. The third paper, entitled "A Rational Form of Stiffened Suspension Bridge," by Gustav Lindenthal, M. Am. Soc. C. E., was presented by the author, and was discussed by Messrs. W. Hildenbrand, Joseph Mayer, R. S. Buck, W. W. Crehore and Gustav Lindenthal.

The Secretary announced the following deaths:

Standish Barry Burton, elected Member, June 1st, 1898; died August 13th, 1904.

Reuben Shirreffs, elected Member, June 4th, 1890; died August 31st, 1904.

William Arthur Pratt, elected Member, December 4th, 1895; died September 19th, 1904.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

September 6th, 1904.—8.40 P. M.—Vice-President Deyo in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Buck, Craven, Croes, Ellis, Gowen, N. P. Lewis, Noble, Osgood and Pegram.

Routine business only was considered.

Seventy-six applications for admission were considered and acted upon.

Nine Associate Members were transferred to the grade of Member.

Six applications for transfer to a higher grade were declined.

Thirteen candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, October 19th, 1904.—At this meeting a paper by C. C. Schneider, M. Am. Soc. C. E., entitled "The Structural Design of Buildings" will be presented for discussion.

This paper is printed in this number of *Proceedings.*

INTERNATIONAL ENGINEERING CONGRESS
AND
THIRTY-SIXTH ANNUAL CONVENTION OF THE SOCIETY.

As previously announced, in the Programme of the **International Engineering Congress,** which has been issued to all members of the Society, there will be meetings of the **Congress** at 10 A. M. each day, beginning Monday, October 3d, and continuing throughout the week, the last meeting of the Congress being held on Saturday morning, October 8th. **Members of the Society in all grades are Members of the Congress.**

The **Thirty-Sixth Annual Convention** of the **Society** will be held on the afternoon of Monday, October 3d, in the Hall of Congresses, Louisiana Purchase Exposition, at 2.30 P. M. At this meeting the President will deliver the Annual Address. At the close of the address of the President, the business meeting required by the Constitution will be held. A meeting of the Board of Direction, as required by the Constitution, will be held at a time to be subsequently determined.

A circular, relating to hotel accommodations, which was prepared by the Local Committee of the Society in St. Louis, has been issued to all members, and in this the "Inside Inn" was recommended as, all things considered, the most available for members and their families.

In this circular it is explained that it is impossible to secure a lower rate for transportation than the Exposition excursion rate established by all railroads, this rate being less than the usual, one fare and one-third, round trip, convention rate.

To all members of the Society who have, in response to the circular already issued, specified the subjects it is their purpose to discuss, copies of such of the papers as have been printed in advance form have already been forwarded, and, upon request, the Secretary will be glad to forward such copies to members who have not already asked for them.

Owing to the large number of papers, which cover many subjects, it will be impossible to forward Advance Copies of all papers to all members of the Congress, and it has been necessary to restrict the issue of Advance Copies to those who expect to present discussions either in person at the Congress or by letter.

INTERNATIONAL ENGINEERING CONGRESS.

CHAIRMAN:

Charles Hermany, President, Am. Soc. C. E.

CHAIRMEN OF SECTIONS:

Section A.—Waterways.

Alfred Noble, Past-President, Am. Soc. C. E.

Section B.—Municipal.

J. James R. Croes, Past-President, Am. Soc. C. E.

Section C.—Railroads.

Robert Moore, Past-President, Am. Soc. C. E.

Section D.—Materials of Construction.

Frederic P. Stearns, M. Am. Soc. C. E.

Section E.—Mechanical.

William Metcalf, Past-President, Am. Soc. C. E.

Section F.—Electrical.

Frank J. Sprague, M. Am. Soc. C. E.

Section G.—Military and Naval.

William P. Craighill, Brig.-Gen. U. S. A. (retired);
Past-President, Am. Soc. C. E.

Section H.—Miscellaneous.

Octave Chanute, Past-President, Am. Soc. C. E.

SECRETARY:

Charles Warren Hunt, *Secretary*, Am. Soc. C. E.

COMMITTEE IN CHARGE OF ENGINEERING CONGRESS.

Henry S. Haines, *Chairman*, Detroit, Mich.
L. F. G. Bouscaren, *Vice-Chairman*, Cincinnati, Ohio.
Charles Warren Hunt, *Secretary*, New York City.
Joseph M. Knap, *Treasurer*, New York City.

William Metcalf, Pittsburg, Pa.
William P Craighill, Charleston, W. Va.
M. T. Endicott, Washington, D. C.
Joseph Ramsey, Jr., St. Louis, Mo.
Robert W. Hunt, Chicago, Ill.
L. B. Stillwell, New York.
George B. Post, New York.
Joseph O. Osgood, Jersey City, N. J.
Benjamin M. Harrod, New Orleans, La.
George W. Melville, Philadelphia, Pa.
Elmer L. Corthell, New York.
Hunter McDonald, Nashville, Tenn.
Palmer C. Ricketts, Troy, N. Y.
M. L. Holman, St. Louis, Mo.
Alfred Craven, New York.
George H. Pegram, New York.
George S. Davison, Pittsburg, Pa.

COMMITTEE OF ARRANGEMENTS FOR THE ANNUAL CONVENTION.

George H. Pegram, *Chairman;*
Alfred Craven, George S. Davison,
Joseph O. Osgood, Hunter McDonald,
Chas. Warren Hunt, *Secretary.*

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers **in the center of the Liberal Arts Building,** and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following Committee:

Robert Moore, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
James L. Frazier, " " Frankfort, Ind.
William Jackson, " " Boston, Mass.
Emil Kuichling, " " New York, N. Y.
J. L. Van Ornum, " " St. Louis, Mo.
John F. Wallace, " " Chicago, Ill.
O. E. Mogensen, *Sect'y,* " " St. Louis, Mo.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The **Boston Society of Civil Engineers** will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings which are held in the same building on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of the **St. Louis Engineers' Club,** in the business center of St. Louis, will be kept open during the World's Fair season, May 1st to December 1st, 1904, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of the **Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, first Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

From August 7th to September 13th, 1904.

DONATIONS.*

TYPES AND DETAILS OF BRIDGE CONSTRUCTION.

By Frank W. Skinner, M. Am. Soc. C. E. Cloth, 9 x 7 in., 6 + 294 pp. New York, McGraw Publishing Company, 1904.

The author states that it is his purpose to present the development of advanced practice, in bridge construction, and its standard details, to illustrate the classes of structures adapted to different conditions, show some of the characteristic differences between American and foreign design and illustrate some primitive or obsolete constructions, recording important and well-known examples. The bridges have been arranged in order and grouped in classes, and the descriptions are in most cases supplemented by specific references to any more extended articles which have been published about them in technical journals or professional papers, and may be consulted in libraries for additional data in special cases. The book is divided into four parts: Part I, Wood and Iron Arch Spans; Part II, Spandrel Braced Arches; Part III, Arch Trusses; and Part IV, Plate Girder Arches. It has an alphabetical index of bridges, and a classified index of bridge details; both indexes are included in four pages.

BROWN'S DIRECTORY OF AMERICAN GAS COMPANIES.

Gas Statistics, 1904. Compiled and corrected by E. C. Brown. Cloth, 10 x 7 in., 272 pp. New York, Press of the Progressive Age, 1904. $5.00.

This book is published annually, and contains statistics of gas companies in the United States, Canada and South America, and of electrical companies where they are operated under the same name as the gas companies. Acetylene and gasolene gas plants are included, and also a list of parent or operating companies. There is a list of officers and members of the gas associations in the United States, an analysis of British gas accounts for 1902–03, and a bibliography for gas men, divided by subject. The arrangement of the whole book is alphabetical, but it also has a one page index of contents.

TRANSPORTATION BY RAIL.

An Analysis of the Maintenance and Operation of Railroads, Showing the Character and Cost of the Service Performed by Railway Companies in the Maintenance of Highways for Commerce, and as Common Carriers of Passengers, Freight and the United States Mails over such Highways. By T. M. R. Talcott. Cloth, 8 x 7 in., 84 pp. Richmond, Va., Whittet and Shepperson, 1904. (Donated by the author.)

The preface states that the statistics given in this book are based on the many years' experience of the author in the construction, maintenance and operation of railways, during which time he had the accounts kept to suit his special method of analyzing the cost of maintenance and operation. This method of analysis was applied to a number of Southern roads for periods of from three to ten years, and the units of cost ascertained differed somewhat for the same service, according to conditions on different roads, such as standards of construction and equipment, varying rates of pay for employees and diversity in the cost of materials and supplies. The road selected as an illustration seemed to represent the average of Southern roads of the same general standard. The statement is made that the present method of accounting, as established by the Interstate Commerce Commission, does not admit of the application of this method of analyzing operating expenses, and therefore the present cost of service cannot be accurately given; but the general managers who wish to know the exact cost of each unit of service on their roads may have their accounts kept so as to admit of this method of analysis.

CHART METHOD OF REDUCING POLARIS OBSERVATIONS.

By Clark Brown. Cloth, 14 x 14 in., 5 pp. Albany, Published by the Author, 1904. Paper, $1.00; cloth, $1.50. (Donated by the author.)

The author states that, having found computations by the usual methods tedious when the observations were made at convenient times in the early evening, he has been led to devise a Chart Method for making the reductions. In preparing this method for publication it was thought best to accompany it with a table of the time of the culmination of Polaris, on a new plan, and also with a set of simple directions for making the observations. The table and chart are prepared from data found in the United States Government publications, and, while not of sufficient refinement for use in extensive geodetic surveys upon which the larger theodolites are used, the author believes them to be as accurate as will be required for use with the engineer's transit, the probable error of the azimuth line being less than the probable error in the measurement of an angle.

THE INDUSTRIAL AND ARTISTIC TECHNOLOGY OF PAINT AND VARNISH.

By Alvah Horton Sabin. Cloth, 9 x 6 in., 6 + 372 pp., illus. New York, John Wiley and Sons; London, Chapman and Hall, Limited, 1904. $3.00.

The writer says that it is his aim to give a correct general outline of the subject of Paints and Varnishes, with a brief account of their modern use and of the principles which are involved in their fabrication and application. It is also stated that many of the facts herein noted, though old, are practically unknown, and some of them exactly anticipate recently patented processes; their value to the public in that way is sufficient excuse for their republication. Scarcely any patents in this line are of any value or validity; and the "secret processes" which are continually vended are for the most part neither secret nor new. The only trade secrets lie in the incommunicable intimate knowledge of the expert, and are made valuable only by his unceasing care, vigilance and conscientiousness. Theories, however, may be made known, and the attention of the student may be intelligently directed to their application. The book contains an alphabetical index of eight pages.

Gifts have also been received from the following:

Aachen Tech. Hochschule. 3 pam.
Abner Doble Co. 1 pam.
Am. Soc. of Mech. Engrs. 1 pam.
Bell, George Joseph. 1 bound vol.
Borxovsxi, J. Th. 1 vol., 1 map, 1 bound vol.
Bradley, C. W. 1 vol
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Cal. Acad. of Sci. 1 vol.
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Comstock, C. W. 1 pam.
Cuba—Secretario de Obras Publicas. 4 vol.
Denver & Rio Grande R. R. Co. 1 pam.
Fisk, W. L. 1 pam., 2 maps.
Floesch, J. M. 1 pam.
Gila Valley Globe and Northern Ry. Co. 1 pam.
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Gould, E. S. 1 vol.
Great Britain—Patent Office. 7 vol., 11 pam.
Hannover Königliche Tech. Hochschule. 1 vol.
Haverhill, Mass.—City Engr. 1 pam.
India—Pub. Works Dept. Rys. 1 vol.
Inst. of Civ. Engrs. 2 bound vol.
Inst. of Civ. Engrs. of Ireland. 1 vol.
Inst. of Min. and Metallurgy. 2 bound vol.
Iowa—R. R. Commrs. 1 bd. vol.
Iron and Steel Inst. 3 bound vol., 1 pam.
Jackson, Granberry. 1 pam.
Jour. of the Royal United Service Inst. 4 nos.
Königliche Tech. Hochschule zu Berlin. 1 pam.
Limbeck, Zdenko Ritter von. 1 pam.
Liverpool Eng. Soc. 1 vol.
McGill Univ. 1 bound vol.
McGraw Pub. Co. 1 vol.
Manchester Assoc. of Engrs. 1 bound vol.
Met. Board of Water Supply. 1 pam.
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New England Cotton Mfgrs. Assoc. 1 bound vol.
New England Water Works Assoc. 1 vol.
New South Wales—Govt. Statistician. 1 bound vol.
New York, Ontario & Western Ry. Co. 1 pam.
North, E. P. 1 pam.
Northampton, Mass.—City Clerk. 1 bound vol.
Patschke, A. 1 pam.
Peabody Coal Co. 1 pam.
Pharr, H. N. 2 pam.
Royal Soc. of Canada. 1 bound vol.
Smith, J. A. 1 pam.
Soc. Belge des Ingenieurs et des Industriels. 3 pam.
Toronto, Ont.—City Engr. 1 bound vol.
Tyrrell, H. G. 1 pam.
U. S. Bureau of Commerce & Labor. 1 vol.
U. S. Bureau of Forestry. 7 pams.
U. S. Bureau of Statistics. 1 vol., 1 pam.
U. S.—Director of the Mint. 14 bound vol., 5 vol., 2 pam.
U. S. Div. of Foreign Markets. 1 vol., 2 pam.
U. S. Office of Exper. Station. 3 pam.
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West Va. Geol. Surv. 1 bound vol.
Western N. Y. Car Service Assoc. 1 pam.
Western Soc. of Engrs. 1 pam.
Woburn, Mass.—City Clerk. 1 bound vol.

BY PURCHASE.

A Treatise on Surveying. Comprising the Theory and the Practice. Part II Higher Surveying. By William M. Gillespie. Revised and enlarged by Cady Staley. New York, D. Appleton & Company, 1902.

Die Vagabundierenden Ströme Elektrischer Bahnen. By Dr. Carl Michalke. (Elektrotechnik in Einzeldarstellungen, Part IV. Edited by Dr. Gustav Benischke). Braunschweig, Friedrich Vieweg und Sohn, 1904.

Technische Hülfsmittel zur Beförderung und Lagerung von Sammelkörpern (Massengütern). Part II. By M. Buhle. Berlin, Julius Springer, 1904.

Die Wasserrohrkessel der Kriegs= und Handelsmarine. Ihre Bauart, Wirkungsweise, Behandlung und Bedienung. Von Walter Leps und Max Dietrich. Rostock, C. J. E. Volckmann, 1904.

Elemente des Wasserbaues. Für Studierende Höherer Lehranstalten und Jüngere Techniker. Von Eduard Sonne und Karl Esselborn. Leipzig, Wilhelm Engelmann, 1904.

Traité de Théorique et Pratique de la Résistance des Matériaux. Appliquée au Béton et au Ciment Armé. Par N. de Tedesco et A. Maurel. Paris, Libraire Polytechnique Ch. Béranger, 1904.

Central Station List and Manual of Electric Light. Published Quarterly the First Day of March, June, September and December. New York, McGraw Publishing Company, 1904.

The Municipal Year Book of the United Kingdom for 1904. Edited by Robert Donald. London, Edward Lloyd, Limited, 1904.

The Drainage of Town and Country Houses. A Practical Account of Modern Sanitary Arrangements and Fittings. By G. A. T. Middleton. London, B. T. Batsford, 1903.

Pollution of Tidal Waters, With Special Reference to Shellfish. Fourth Report of the Commissioners Appointed in 1898 to Inquire and Report What Methods of Treating and Disposing of Sewage may Properly be Adopted. London, Eyre and Spottiswoode, 1904.

Directory to the Iron and Steel Works of the United States. Embracing a Full Description of the Blast Furnaces, Rolling Mills, Steel Works, Tinplate and Terne Plate Works, and Forges and Bloomaries in the United States; also Classified Lists of the Wire Rod Mills, the Structural Mills, Plate Sheet, and Skelp Mills, Black Plate Mills, Rail Mills, Steel Casting Works, Bessemer Steel Works, Open Hearth Steel Works, and Crucible Steel Works. Compiled and Published by the American Iron and Steel Association. Sixteenth edition. Corrected to August 1, 1904. Philadelphia, American Iron and Steel Association, 1904.

Modern Practical Electricity. Electricity in the Service of Man; A Popular and Practical Treatise on the Applications of Electricity in Modern Life. Vol. IV. By R. Mullineux Walmsley. Chicago, W. T. Keener and Co.

Der Kaskadenumformer. Seine Theorie, Berechnung, Konstruktion und Arbeitweise. Von E. Arnold und J. L. la Cour. Sonderabdruck aus Sammlung elektrotechnischer Vorträge. Herausgegeben von Dr. Ernst Voit. Band VI. Berlin, Ferdinand Enke, 1904.

SUMMARY OF ACCESSIONS.

August 7th to September 12th, 1904.

Donations (including 14 duplicates and 4 numbers completing volumes of periodicals)	177
By purchase	13
Total	190

MEMBERSHIP.

ADDITIONS.

MEMBERS.		Date of Membership.
Brace, James Henry. Care, P., N. Y. & L. I. R. R., 20 West 34th St., New York City	Assoc. M. M.	Jan. 2, 1901 Sept. 6, 1904
Holcombe, Joseph Gales. Prin. Asst. Engr., Bureau of Eng., Manila, Philippine Islands		May 4, 1904
Robbins, Allan Appleton. Res. Engr., N. Y. & L. I. R. R., 1 East 42d St., New York City	Assoc. M. M.	Oct. 2, 1901 Sept. 6, 1904
ASSOCIATE MEMBERS.		
Armour, Charles Webster L. 619 Garrison Ave., Fort Smith, Ark		June 1, 1904
Baker, Hugh Cossart, Jr. 30 Gold St., New York City		May 4, 1904
Farnham, Charles Henry. Care, Am. China Development Co., Canton, China		June 1, 1904
Johnstone, William Bard. 22 West 25th St., New York City		May 4, 1904
Wild, Herbert Joseph. Asst. to Supt. of Constr., U. S. Life Saving Service, 721 Broad St., Meriden, Conn	Jun. M.	Mar. 31, 1903 April 6, 1904
JUNIORS.		
Banker, Edward Warren. 2d Lieut., U. S. M. C., U. S. Naval Academy, Annapolis, Md		Mar. 1, 1904
Crawley, Ernest Willard. 305 Exchange Bldg., New Haven, Conn		May 31, 1904

CHANGES OF ADDRESS.

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Bisbee, Fred Milton.................La Junta, Colo.

Bixby, William Herbert.............Col., Corps of Engrs., U. S. A., Care, Military Secy., War Dept., Washington, D. C.

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Cornell, George Birdsall............20 Broad St., New York City.

Crosby, Benjamin Lincoln............Prin. Asst. Engr., N. P. Ry. Co., Tacoma, Wash.

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Gould, William Tillotson	Care, Penn., N. Y. & L. I. R. R. Co., 225 West 33d St., New York City.
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Johnson, Lorenzo Medici	Pres., Pitts., Shawmut & Northern R. R. Co., 45 Wall St., New York City.
Johnson, Lucien Samuel	Dam 11, Ohio River, Wellsburg, W. Va.
Kinsley, Thomas Pearson	Broadway and 187th St., New York City.
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Münster, Andrew Wendelbo	Acting Chf. Engr., Chic. Gt. West. Ry., St. Paul, Minn.
O'Rourke, John Francis	Cons. Engr., 1 West 34th St., New York City.
Paschke, Theodore	1 West 100th St., New York City.
Robinson, Albert Fowler	Bridge Engr., A., T. & S. F. Ry. System, Room 1000, Ry. Exchange Bldg., Chicago (Res., 608 Marion St., Oak Park), Ill.
Robinson, George Henry	Drawer 821, Vancouver, B. C., Canada.
Ruggles, William Burroughs	Care, Isthmian Canal Comm., Culebra, Canal Zone, Panama, Care, New York Post Office.
Smith, Charles William	393 Lewis Ave., Brooklyn, N. Y.
Thomas, George Edward	Superv. Engr., I. B. R. T., 59th St. Power House (Res., 50 West 92d St.), New York City.
Webb, Walter Loring	Cons. Engr., 2222 Land Title Bldg., Philadelphia, Pa.
Webster, Charles Edward	Cons. Engr., South Bethlehem, Pa.
Williams, Gardner Stewart	1503 Washtenaw Ave., Ann Arbor, Mich.

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Barnes, William Thomas	61 Elm St., Waterville, Me.
Bascome, Western Radford	3759 Westminster Pl., St. Louis, Mo.
Bauer, Jacob Louis	25 Dix Bldg., Elizabeth, N. J.

Bell, Alfred Carroll .... Contr. Engr., Wisconsin Bridge & Iron Co., 101 Nineteenth St., Milwaukee, Wis.

Coates, Frank Raymond .... 318 Grand Central Station, Chicago, Ill.

Crew, Charles Corwin......... ..... Engr., Morgan County Coal Co., Barnett, Mo.

Cudworth, Frank Grant .... Designing and Const. Engr., Cudworth, Axtell & Co., 616 K. C. Life Bldg., Kansas City, Mo

Davis, Carleton Emerson........... San. Engr., Isthmian Canal Comm., Ancon, Canal Zone, Panama.

de Vou, James Laird................ Care, Am. Bridge Co., Erecting Dept., Ambridge, Pa.

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Endemann, Herman Karl............ Asst. Engr., Topographical Bureau, Borough of Queens, 78 Bergen Ave., Jamaica, N. Y.

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Sweitzer, Nelson Bowman........... U. S. Examiner of Surveys, Gen. Land Office, Valentine, Nebr.

Tompkins, Edward De Voe.......... Mgr., Phila. Office, Columbian Fireproofing Co., 26 West 26th St., New York City.

WATSON, IRVINE.......................95 Maryland St., Wheeling, W. Va.
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ASSOCIATES.

LYMAN, RICHARD ROSWELL............Univ. of Utah, Salt Lake City, Utah.

JUNIORS.

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FELLOWS.

DU PONT, BIDERMAN..................808 Broome St., Wilmington, Del.

DEATHS.

BERGENGREN, FRITZ CARL ANDERS GEORG.Elected Associate Member, December 2d, 1896; died August 8th, 1904.
BURTON, STANDISH BARRY............Elected Member June 1st, 1898; died August 13th, 1904.
GARDNER, GEORGE CLINTON...........Elected Member, November 3d, 1875; died August 12th, 1904.
GREENE, JOSEPH NORTON.............Elected Member, October 5th, 1887; died July 26th, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(August 4th to September 10th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.

(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.

(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.

(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.

(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.

(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.

(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.

(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.

(9) *Engineering Magazine*, New York City, 25c.

(10) *Cassier's Magazine*, New York City, 25c.

(11) *Engineering* (London), W. H. Wiley, New York City, 25c.

(12) *The Engineer* (London), International News Co., New York City, 35c.

(13) *Engineering News*, New York City, 15c.

(14) *The Engineering Record*, New York City, 12c.

(15) *Railroad Gazette*, New York City, 10c.

(16) *Engineering and Mining Journal*, New York City, 15c.

(17) *Street Railway Journal*, New York City, 35c.

(18) *Railway and Engineering Review*, Chicago, Ill., 10c.

(19) *Scientific American Supplement*, New York City, 10c.

(20) *Iron Age*, New York City, 10c.

(21) *Railway Engineer*, London, England, 25c.

(22) *Iron and Coal Trades Review*, London, England, 25c.

(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.

(24) *American Gas Light Journal*, New York City, 10c.

(25) *American Engineer*, New York City, 20c.

(26) *Electrical Review*, London, England.

(27) *Electrical World and Engineer*, New York City, 10c.

(28) *Journal*, New England Water-Works Assoc., Boston, $1.

(29) *Journal*, Society of Arts, London, England, 15c.

(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.

(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.

(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.

(33) *Le Génie Civil*, Paris, France.

(34) *Portefeuille Économique des Machines*, Paris, France.

(35) *Nouvelles Annales de la Construction*, Paris, France.

(36) *La Revue Technique*, Paris, France.

(37) *Revue de Mécanique*, Paris, France.

(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.

(39) *Railway Master Mechanic*, Chicago, Ill., 10c.

(40) *Railway Age*, Chicago, Ill., 10c.

(41) *Modern Machinery*, Chicago, Ill., 10c.

(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.

(43) *Annales des Ponts et Chaussées*, Paris, France.

(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.

(45) *Mines and Minerals*, Scranton, Pa., 20c.

(46) *Scientific American*, New York City, 8c.

(47) *Mechanical Engineer*, Manchester, England.

(54) *Transactions*, Am. Soc. C. E., New York City, $5.

(55) *Transactions*, Am. Soc. M. E., New York City, $10.

(56) *Transactions*, Am. Inst. Min. Engrs.; New York City, $5.

(57) *Colliery Guardian*, London, England.

(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.

(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.

(60) *Municipal Engineering*, Indianapolis, Ind., 25c.

(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.

(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.

(63) *Minutes of Proceedings*, Inst. C. E. London, England.

(64) *Power*, New York City, 20c

(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.

(66) *Journal of Gas Lighting*, London England, 15c.

(67) *Cement and Engineering News*, Chicago, Ill., 25c.

(68) *Mining Journal*, London, England.

(69) *Mill Owners*, New York City, 10c.

(70) *Engineering Review*, New York City, 10c.

(71) *Journal*, Iron and Steel Inst., London, England

(72) *Street Railway Review*, Chicago, 30c.

(73) *Electrician*, London, England, 18c.

(74) *Transactions*, Inst. of Min. and Metal, London, England.

(75) *Proceedings*, Inst. of Mech. Engrs., London, England.

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PROCEEDINGS

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OF

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(INSTITUTED 1852.)

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AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

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OF THE SOCIETY.

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2.30 P. M.—The First Session of the Convention was held in the Hall of Congresses, Administration Building, Louisiana Purchase Exposition.

The President delivered the Annual Address.

At the conclusion of the address the Business Meeting was held, President Hermany in the chair; Chas. Warren Hunt, Secretary.

General William P. Craighill, Past-President, Am. Soc. C. E.—Mr. President, if it is in order, I would like to offer a resolution of a few lines, which seems to me to be appropriate at this time, and I hope it will be seconded and unanimously adopted.

"*Whereas*, The International Congress of Engineers, now in session in such successful progress in this city, is the result of the suggestion and management of the American Society of Civil Engineers, through the agency of its committee, of which Henry S. Haines is chairman, and Chas. Warren Hunt is secretary;

Resolved, That the earnest thanks of the American Society of Civil Engineers are hereby cordially given to our committee for the able, faithful and excellent way in which its duties have been performed, in the general arrangements for the Congress, as well as the many and varied details involved in the outcome now before us."

Seconded by G. A. Marr, M. Am. Soc. C. E.

General Craighill.—It will be observed, Mr. President, that in the last few words I refer to the outcome now before us. One prominent feature of that outcome which is most interesting to me, and must and will be, I suppose, interesting to every person present, is the fact that we have on the same platform here the President of the British Institution of Civil Engineers as our distinguished guest, Sir William White, and the President of the American Society of Civil Engineers. That is enough to justify everything that has been done. (Applause.)

But I wish also to call attention to a fact, which strikes me as an officer of the army, as well as a member of the Society, and that is the fact that we see around us, not only our own star-spangled banner, but the ensign of Great Britain, floating over our heads, and many flags of other Nations. But there is another outcome, Mr. President, to which I want to call special attention, and that is what appeals to me as I face these men before me; it is the bringing together of men of brains, men of energy, and men of activity, who know how to design, and how to execute. And, last but not least, I want to call attention to the presence of the ladies. Without them we can do nothing. (Applause.)

The President.—Are there any further remarks? If not, the chair will put the resolution.

The resolution was unanimously adopted.

The Secretary.—Mr. President, before some members of the Congress who are not interested in our Business Meeting leave the hall, I should like to make it known that the Engineers' Club of St. Louis has gotten out a very nice World's Fair Souvenir, a number of copies of which are in the Secretary's office, and which can be had upon application there.

It is possible that some of the members of the Board of Direction might leave before the close of this meeting, and I will therefore announce that the meeting of the Board of Direction will be held at 9:30 o'clock to-morrow morning at the office of the Secretary in this building.

Mr. President, the first business to come before this meeting is the question of determining the time and place of holding the next Annual

Convention of the Society. Some time ago the usual form of circular letter was sent to all members, asking them to reply, giving their choice for the time and place of holding the next Annual Convention. I have a report of the answers received, and I beg to report the result as follows:

Total Number of Votes Received for Place, 798.

Distributed as follows:

Cleveland	586	Denver	6
Duluth	52	Washington, D. C	6
Portland, Ore.	35	City of Mexico	4
Boston	15	Mackinac Island	4
New Orleans	11	Philadelphia	4
Pittsburg	9	Seattle	4
New York	8	San Francisco	4
Chicago	7		

The following places received two votes each:

Cape May,
Cincinnati,
Detroit,
Eureka Springs,
Havana,
Lake Champlain,
Louisville,
Quebec,
Saratoga Springs,
Salt Lake City,
Thousand Islands,
Yellowstone Park.

The following places received one vote each:

Alexandria Bay, N. Y.,
Atlantic City,
Baltimore,
Buffalo,
Hot Springs, Va.,
Kansas City,
Lake George,
Los Angeles,
Mackinaw,
Memphis,
Milwaukee,
Minneapolis,
Montreal,
Niagara Falls,
Palm Beach,
Port Arthur,
Saratoga,
Near Portland Cement Industry,
No Choice.

Many duplicate ballots have come in too late for reclassification, and the above list gives all the ballots, in which a number of members have voted twice. In most cases these ballots have been in favor of Cleveland, Duluth, and Portland, and a correct return of all votes would take a number of ballots from other places.

Total Number of Answers Received Suggesting the Time for Next Convention, 798.

	No. of Votes.		No. of Votes.
January	1	Mardi Gras—New Orleans	4
March	1	June to September	1
April	3	June or September	1
May	8	July or August	21
June	618	July to September	1
July	25	September or October	1
August	22	October or August	1
September	25	During Lewis and Clark Exposition, Portland	5
October	27	November to April	1
November	3	Early Summer	1
December	2	First Half of Any Month	1
		No Choice	25

I also have the following letters:

"SEPTEMBER 9TH, 1904.

"TO THE PRESIDENT AND MEMBERS OF THE AMERICAN SOCIETY OF CIVIL
"ENGINEERS, IN SESSION AT ST. LOUIS, MO.

"GENTLEMEN: On behalf of the business men of Cleveland, the Board of Directors of the Cleveland Chamber of Commerce extends to your Society a very cordial invitation to hold its next meeting in Cleveland. The directors are confident that your delegates would thoroughly enjoy the time spent in Cleveland, and it is sincerely hoped that the city may be honored by an acceptance of this invitation.

"By order of the Board of Directors of the Cleveland Chamber of Commerce.

"F. A. SCOTT,
"*Secretary.*"

"DULUTH, MINN., SEPT. 8TH, 1904.

"TO THE PRESIDENT AND MEMBERS OF THE AMERICAN SOCIETY OF CIVIL
ENGINEERS, ST. LOUIS, MISSOURI.

"GENTLEMEN: The Commercial Club of Duluth hereby extends a cordial invitation to your Association to hold your convention for 1905 in our city.

"There are many reasons why we ask for this courtesy from your Association, believing that the Northwest is entitled to the convention of the society, and that it is entirely proper that the third port in volume of business in the United States should be recognized.

"We have a most excellent convention hall which would be furnished free for the use of the convention. We have some of the best hotels in the State with ample accommodations for the delegates. We have an ideal climate at all times and particularly at the time in which the convention will be held.

"Duluth-Superior harbor is one of the finest in the world, containing forty-nine miles harbor frontage, with an area of eleven and three-quarters square miles. About it are located mammoth ore and coal docks, immense grain elevators with a capacity of thirty-five million bushels, a blast furnace, coking plant, shipyard, dry docks, immense lumber mills, etc. The novel Aerial Bridge, nearly 400 ft. span, at a height of 188 ft., is in process of erection across the Duluth Ship Canal, and will be completed this year.

"We believe that Duluth and its surroundings offer many attractions both from the standpoint of engineering and scenic beauty, and we think that the people will want to come and see the Metropolis of the great Northwest.

"We urge you to accept our invitation to come to this City, and are satisfied that if you do, you will want to come again.

"Very respectfully,
"W. A. McGonagle, *President.*
"H. V. Eva, *Secretary.*

"*Convention Committee* { E. L. Millar,
W. B. Silvey,
E. C. Little."

I also have a letter from H. H. Wadsworth, M. Am. Soc. C. E., enclosing a certified copy of a resolution passed by the Common Council of the City of Duluth, September 6th, 1904, and a letter from the Northern Steamship Co., promising co-operation in the matter of transportation. The Resolution referred to is as follows:

By Alderman Wing:

"*Resolved:* That the attention of the American Society of Civil Engineers is hereby called to the advantages of Duluth as a convention city, it being easily accessible either by boat or rail, with a most delightful summer climate, excellent hotel accommodations, interesting municipal and manufacturing plants and the mines of the Mesaba and Vermilion iron ranges being in close proximity.

"*Resolved, further*, That said Society is hereby extended a cordial invitation to hold their annual session for the year 1905 at this place.

"Alderman Wing moved the adoption of the resolution, and it was declared adopted on the following vote:

"Yeas—Alderman Barnes, Chesney, Harker, McEwen, Moore, Olson, Sang, Schaffer, Tessman, Tischer, Waugh, Wilson, Wing, President Haven—14.

"Nays—None.

"Passed Sept. 6, 1904.
"Approved Sept. 8, 1904."

I also have the following letters from Oregon:

"Salem, September 15th, 1904.

"Charles Warren Hunt, Esq.,
"*Secretary American Society Civil Engineers,*
"New York City, N. Y.

"Dear Sir: I am advised that the American Society of Civil Engineers are to hold their annual convention next month in St. Louis, and that they will at that time select a place for holding the convention for the year 1905. As Executive of this State I desire to extend to your Society a most cordial invitation to meet in Portland, Oregon, at that time. The people of the State are making extensive preparations to celebrate next year the hundredth anniversary of the expedition of Lewis and Clark to the Oregon country. There has been contributed to this end by our own people something near one million dollars, the Congress of the United States has contributed liberally, and our sister States have all been generous in doing whatever is necessary to make the Exposition a success.

"If your Society will meet with us here next year I can assure you that they will be royally received and entertained by people of Oregon, and in addition to that they will enjoy a magnificent climate, and the most beautiful scenery that it has ever been their lot to experience.

"Trusting that you may be able to induce your Society to accept this invitation, I have the honor to remain,

"Yours very respectfully,

"GEO. A. CHAMBERLAIN."

"PORTLAND, SEPT. 12TH, 1904.

"MR. CHARLES WARREN HUNT,

"*Secretary of the American Society of Civil Engineers, No. 220 West Fifty-seventh street, New York, New York.*

"DEAR SIR: As Mayor of the City of Portland, Oregon, I respectfully and earnestly invite you to hold the next meeting of your Association in this City, in 1905, at which time there will be here the Lewis and Clark Centennial and American Pacific Exposition and Oriental Fair.

"It is expected that at this Exposition there will be a magnificent display of the productions of the Pacific States and Territories, with many contributions from the Oriental World.

"To those of you who live in the East, the journey across the Continent will be both interesting and instructive, and without such a journey you can have no adequate idea of the territorial extent and greatness of our country.

"Portland is a city of about 120 000 inhabitants, with a rapidly increasing population. It is situated on the Willamette River, about 100 miles from the Pacific Ocean and 12 miles from the Columbia River, and ocean-going steamships and sailing vessels from all parts of the commercial world visit its harbor.

"I can confidently say that if you will accept this invitation you will find Portland a healthful, prosperous and beautiful city.

"Oregon scenery is diversified with rivers and lakes, hills and vales, fertile valleys and mountains, some of which are covered with perpetual snow, and its grandeur and beauty in these respects are unsurpassed by any country.

"Portland will be pleased to extend you its hospitality.

"Yours very truly,

"GEO. H. WILLIAMS,

"*Mayor.*"

THE PRESIDENT.—What will you do with the report of the Secretary on the question of place and time of holding our next Annual Convention?

Robert Moore, Past-President, Am. Soc. C. E.—I believe that I neglected to vote in response to the petition of the Board of Direction. I now desire to offer this resolution, to-wit: "That it be the sense of this meeting that the next Annual Convention should be held in the City of Cleveland."

I know that that was very largely the feeling of the members on this subject from the vote taken two years ago, and I think it is now timely that we should hold a meeting in a central State like that, particularly in a city that is so enterprising, beautiful and hospitable as the City of Cleveland. I therefore make that motion.

Motion seconded by Mr. Smith.

J. N. Chester, M. Am. Soc. C. E.—With all due respect to commercial points, I believe that the success of our conventions, as well as the pleasure of those who attend, would depend largely upon one thing, and that is a hotel large enough to accommodate the entire convention, and I do not believe the cities that have been mentioned will afford such accommodation. So far as time is concerned, of course the location of the convention should in a measure decide the time, but I would urge that we consider our own convenience and the success of our convention rather than the wishes of some commercial center, or any place that might desire us to come there. I should not even vote unless conditions which I have before mentioned could be met with, and I further urge that we select some place where there is a hotel that can accommodate us and do so comfortably.

G. S. Williams, M. Am. Soc. C. E.—I would move to amend the motion just presented by striking out all after the enacting clause and substituting, "that the thanks of this society be extended to the cities (or their representatives) of Cleveland, Duluth and Portland, and that the time and place of holding the next Annual Convention be referred to the Board of Direction with power."

Seconded by General Craighill.

Mr. Moore.—It is only fair to the Board of Direction that this meeting should express its preference. The motion I made was simply that it be the sense of this meeting. It is very important that the Board of Direction should know what the real wishes of the members here assembled are, and I do not think we ought to evade that by such an amendment as that proposed by Mr. Williams. I think the meeting should express itself one way or the other. There is a choice of cities and places, any of which will be good, and I do not think there is any reason for dodging it now.

Geo. W. Fuller, M. Am. Soc. C. E.—It seems to me that the result of the letter-ballot ought to have influence in a matter of this kind, because those who have voted have expressed their opinion, and a great many more votes have been received than there are persons present.

A vote on the amendment offered by Mr. Williams was taken and resulted in sixty-five yeas and thirty-four nays, and the motion as amended was adopted.

THE SECRETARY.—The Secretary knows of no further business to come before the meeting.

On motion, the Business Meeting adjourned.

October 19th, 1904.—The meeting was called to order at 8.40 P. M., R. S. Buck, Director, in the chair; Chas. Warren Hunt, Secretary, and present, also, 156 members and 71 guests.

A paper by C. C. Schneider, M. Am. Soc. C. E., entitled "The Structural Design of Buildings," was presented by the author.

The Secretary presented communications on the subject by Messrs. W. B. W. Howe, Charles Worthington, J. R. Worcester and L. J. Johnson.

The subject was discussed orally by Messrs. Henry B. Seaman, Jos. H. O'Brien, Augustus Smith, F. T. Llewellyn, H. P. Macdonald, H. W. Brinckerhoff, Frederick Wilcock, G. H. Blakeley, J. F. O'Rourke, O. E. Hovey, John B. Clermont, V. I. H. Hewes, E. W. Stern and the author.

The Secretary announced that a Special Committee of the Board of Direction canvassed the ballot for membership on October 5th, 1904, and that the following candidates were elected:

AS MEMBERS.

RAYMOND FRANCIS ALMIRALL, New York City.
HUBERT KEENEY BISHOP, Hudson, N. Y.
FRANCIS OGDEN BLACKWELL, New York City.
CHESTER HARVEY CHAMBERLIN, Boyce, La.
THOMAS FENNING CHAPPELL, New York City.
SPENCER COSBY, Manila, Philippine Islands.
WILLIAM GRIFFING FORD, Brooklyn, N. Y.
JAMES FORGIE, New York City.
JAMES LINCOLN FYFE, Chicago, Ill.
EDWARD DANA HARDY, Washington, D. C.
LEONHARD JOHN HOHL, Oroville, Cal.
RUFUS CAMERON HUNT, New York City.
HERMANN KOWER, Berkeley, Cal.
FREDERICK WILLIAM LA FORGE, Fort Terry, N. Y.
OTTO HEINRICH LANG, Dallas, Tex.
WILLIAM DOMINICK LARRABEE, Los Angeles, Cal.
FRANK MILLER, New York City.
EUSEBIUS JOSEPH MOLERA, San Francisco, Cal.
JOHN EDWIN MOORE, Chicago, Ill.
GEORGE HARRISON NEILSON, Braeburn, Pa.

Willard Pope, Walkerville, Ont., Canada.
Wendell Monroe Reed, Roswell, N. Mex.
Louis Davidson Ricketts, Globe, Ariz.
Walter Herbert Sears, Katonah, N. Y.
Harry Randolph Talcott, Cumberland, Md.
Frank Teichman, San Francisco, Cal.
James Wilson Grimes Walker, Charleston, S. C.

As Associate Members.

William Brokaw Bamford, New York City.
Frank Colburn Bowler, Millinocket, Me.
Stephen Pearson Brown, Stratford, Conn.
Newton Albert Kendall Bugbee, Trenton, N. J.
Charles Joseph Carroll, Durango, Mexico.
George Washington Corrigan, Self, Ark.
Jackson Colborn Hitchman, City of Mexico, Mexico.
Stephen Ephraim Kieffer, Berkeley, Cal.
Archibald Angus Macdonald, New York City.
John de Navarre Macomb, Jr., Lawrence, Kans.
Alfred Moyer Meyers, Milwaukee, Wis.
William Pool Parker, Kansas City, Mo.
George Whitfield Pfeiffer, Daiquiri, Cuba.
Louis Adams Robb, Newark, N. J.
William Kerper Runyon, Newark, N. J.
Thomas Bartlett Sears, Lawrence, Kans.
Frank Cummings Shepherd, New York City.
Tyrrell Bradbury Shertzer, New York City.
Chester Wason Smith, Clinton, Mass.
William Freeman Stevenson, New York City.
James Boorman Strong, Niagara Falls, N. Y.
Ralph Cone Taggart, New York City.
Richard Fenwick Thorp, Munaar, Madura Dist., South India.
Austin King Tiernan, Salt Lake City, Utah.
Charles Lucas Wachter, New York City.

As Associate.

James Morton Caird, Troy, N. Y.

The Secretary announced the following deaths:

Alexander Macomb Miller, elected Member June 6th, 1888; died September 14th, 1904.

Van Norman McGee, elected Associate Member, June 6th, 1900; died September 28th, 1904.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, November 2d, 1904.—8.30 P. M.—A regular business meeting will be held. "A New Method of Tunneling as Applied to the Construction of the 14 and 15-ft. Bay Ridge Sewer," will be described by James C. Meem, Assoc. M. Am. Soc. C. E., and illustrated with lantern slides.

Wednesday, November 16th, 1904.—8.30 P. M.—At this meeting Walter C. Parmley, M. Am. Soc. C. E., will address the Society and describe the Walworth Sewer, Cleveland, Ohio, illustrating his remarks with lantern slides.

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit, and the establishment of Headquarters for visiting engineers **in the center of the Liberal Arts Building**, and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following committee:

Robert Moore, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
James L. Frazier, " " Frankfort, Ind.
William Jackson, " " Boston, Mass.
Emil Kuichling, " " New York, N. Y.
J. L. Van Ornum, " " St. Louis, Mo.
John F. Wallace, " " Chicago, Ill.
O. E. Mogensen, *Sec'y*, " " St. Louis, Mo.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The **Boston Society of Civil Engineers** will welcome any member of the American Society of Civil Engineers at its library and reading room, 715 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of the **St. Louis Engineers' Club,** in the business center of St. Louis, will be kept open during the World's Fair season, May 1st to December 1st, 1904, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of the **Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, first Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

LIST OF NOMINEES FOR THE OFFICES TO BE FILLED AT THE ANNUAL ELECTION, JANUARY 18th, 1905.

The following list of nominees for the offices to be filled at the Annual Meeting, January 18th, 1905, received from the Nominating Committee, was presented to the Board of Direction at its meeting on October 6th, 1904. The list has already been mailed to all Corporate Members.

For President, to serve one year:

C. C. Schneider, New York City.

For Vice-Presidents, to serve two years:

M. L. Holman, St. Louis, Mo.
Emil Kuichling, New York City.

For Treasurer, to serve one year:

Joseph M. Knap, New York City.

For Directors, to serve three years:

Morris R. Sherrerd, Newark, N. J., representing District No. 1.
Austin L. Bowman, New York City, representing District No. 1.
Hezekiah Bissell, West Medford, Mass., representing District No. 2.
Edwin A. Fisher, Rochester, N. Y., representing District No. 3.
William B. Landreth, Albany, N. Y., representing District No. 3.
George S. Pierson, Kalamazoo, Mich., representing District No. 5.

ACCESSIONS TO THE LIBRARY.

From September 13th to October 11th, 1904.

DONATIONS.*

MAXWELL'S THEORY AND WIRELESS TELEGRAPHY.

Part I, Maxwell's Theory and Hertzian Oscillations. By H. Poincaré; translated by Frederick K. Vreeland. Part II, The Principles of Wireless Telegraphy; by Frederick K. Vreeland. Cloth, 9 x 6, 11 + 255 pp., illus. New York, McGraw Publishing Company, 1904. $2.

The author states that the object of this book is to give a physical treatment of Maxwell's theory and its applications to some modern electrical problems, to set forth the fundamental principles which underlie all electrical phenomena, according to Maxwell and his followers, to show how these principles explain the ordinary facts of electricity and optics and to derive from them a practical understanding of the essentials of wireless telegraphy. He states that it has been his purpose in Part II to take up the thread where M. Poincaré dropped it, carrying the line of thought into the practical field of wireless telegraphy, and applying the principles laid down in Part I to the various problems involved; not intending it to be a treatise on wireless telegraphy, the object being rather to deal with principles and to trace the development of the art in its essential features. Where specific cases are cited they are chosen with reference to their fitness to illustrate an idea, and they are treated with a view to emphasize that which is essential and minimize superficial or unimportant details. An alphabetical index of six pages is included.

THE STORY OF AMERICAN COALS.

By William Jasper Nicolls, M. Am. Soc. C. E. Cloth, 8 x 6 in., 396 pp. Philadelphia and London, J. B. Lippincott Company, 1904.

The preface states that the "Story" has been written for those interested in American Coals either as operators, miners, dealers, carriers, or the multitude of consumers—the American people. During years of employment in the coal fields of Pennsylvania, the writer has gathered the material from every available source, and added it to his practical knowledge gained by experience. The simple arrangement of the chapters, beginning with the origin of coal and its development, together with a description of the different routes by which it reaches the consumer, and the various uses to which it is put, is followed by a complete index, so that the book can be used for reference. This second edition has been carefully revised and brought up to date. Since the first was issued the United States has passed from second place in coal production to the head of all other nations. The index covers eighteen pages.

TELEPHONY.

A Manual of the Design, Construction and Operation of Telephone Exchanges. In Six Parts. Part V, The Substation. By Arthur Vaughan Abbott. Cloth, 8 x 6, 17 + 473 pp., illus. New York, McGraw Publishing Company, 1904. $1.50.

The fifth part of Mr. Abbott's work on the Telephone is devoted to the substation. The author says that little that is novel can be claimed for the present presentation. Historical references are of the briefest, as thousands of devices are not even mentioned because, however ingenious, or otherwise, they have for one reason or another failed to meet the test of time and experience. The attempt has been made to present the subject in its practical aspect only, but withal to embrace the point of view of the subscriber as well as that of the telephone manager. The Contents are: Introduction; The Receiver; Telephone Transmitters; Induction Coils and Sub-Station Circuits; Transmission and Current Supply; Signalling Apparatus; Protection; Party Lines; Sub-Station Assemblage; Costs of Installation and Operation.

Gifts have also been received from the following:

Alaska Treadwell Gold Min. Co. 1 pam.
Am. Inst. of Archts. 1 vol.
Atchison, Topeka & Santa Fé Ry. Co. 1 pam.
Bloomfield, N. J.—City Council. 2 pam.
Boston & Maine R. R. 1 pam.
Brit. Assoc. for the Advancement of Sci. 1 bound vol.
Cape of Good Hope—Director of Rys. 3 vol.
Chicago & Alton Ry. Co. 1 pam.
Chicago & North Western Ry. Co. 1 pam.
Chicago Great Western Ry. Co. 1 pam.
Chicago, Milwaukee & St. Paul Ry. Co 1 pam.

Colo. & Southern Ry. Co. 1 pam.
Eidg. Hydrometrisches Bureau. 2 pam.
Engrs. Club of Philadelphia. 1 pam.
Fisk, W. L. 1 pam., 3 maps.
Fort Worth & Denver City Ry. Co. 1 pam.
Great Britain—Patent Office. 6 vol., 6 pam.
Gulf & Ship Island R. R. Co. 1 pam.
Hocking Valley Ry. Co. 1 pam.
Huergo, L. A. 3 bound vol., 3 vol., 1 pam., 11 maps.
Ill. Central R. R. Co. 1 pam.
Ind.—State Geologist. 1 bound vol., 1 map.
Interstate Commerce Com. 10 pam.
Inst. of Naval Archts. 1 bound vol.
Lawrence, Mass.—Water Board. 1 pam
Lehigh Valley R. R. 1 pam.
Loweth, C. F. 2 pam.
Me. Central R. R. Co. 1 pam.
Min. Soc. of Nova Scotia. 1 pam.
Minneapolis, St. Paul & Sault Ste. Marie Ry. Co. 1 pam.
Missouri, Kansas & Texas Ry. Co. 2 pam.
Montclair, N. J.—Board of Health. 2 pam.
Nashville, Chattanooga & St. Louis Ry. Co. 1 pam.
New England Assoc. of Gas Engrs. 1 bound vol.
New South Wales—Ry. Commr. 1 pam.
N. Y. City—Dept. of Parks. 1 bound vol.
N. Y. City—Dept. of Water Supply, Gas & Electricity. 1 bound vol.
N. Y. Central & Hudson River R. R. Co. 1 pam.
Philadelphia—Bureau of Water, 1 bound vol., 1 pam.
Philadelphia—Mayor. 3 vol.
Rutland R. R. Co. 1 pam.
St. Louis Southwestern Ry. Co. 1 pam.
Southern Ind. Ry. Co. 1 pam.
Toledo, Peoria & Western Ry. Co. 1 pam.
Trenton, N. J.—State Geol. 1 bound vol
U. S.—Geol. Surv. 4 vol., 8 pam.
U. S. Office of Exper. Stations. 5 pam.
U. S.—War Dept. 1 vol.
Verein deutscher Portland-Zement Fabrikanten. 1 pam.
Vermehren, Ed. 1 pam.
Webster, G. S. 1 bound vol.
Wis. Geol. and Natural History Surv. 1 bound vol.
Ziffer, E. A. 1 pam.

BY PURCHASE.

The Encyclopedia Americana. Vol. 16. New York, Chicago, The Americana Company.

Proceedings of the Indiana Engineering Society. 20th-24th Annual Reports. Greenfield and Indianapolis, Ind., 1900-04.

Proceedings of the Association of County Surveyors and Civil Engineers of the State of Indiana at its Second Annual Meeting held in Indianapolis, January 17th and 18th, 1882; together with the Constitution and By-Laws, Registered Members, etc. Indianapolis, 1882.

Repertorium der Technischen Journal-Literatur. Herausgegeben in Kaiserlichen Patentamt. Jahrgang 1903. Berlin, Carl Heymanns, 1904.

SUMMARY OF ACCESSIONS.

September 13th to October 11th, 1904.

Donations (including 14 duplicates)	123
By purchase	8
Total	131

MEMBERSHIP.

ADDITIONS.

MEMBERS.

MEMBERS.		Date of Membership.
Abbott, Fred Walter. 303 Hale Bldg., Philadelphia, Pa.		Sept. 7, 1904
Alden, Charles Ames. Chf. Draftsman, F., S. & S. Dept., The Pennsylvania Steel Co., Steelton, Pa.	Assoc. M. M.	May 4, 1898 Sept. 6, 1904
Allen, William Andrew. Engr., United Lead Co., 71 Broadway, New York City.	Assoc. M. M.	Feb. 6, 1901 Sept. 6, 1904
Blodgett, Albert Morrill. Civ. Engr. and Bridge Contr., 405 Thayer Bldg., Kansas City, Mo.		Sept. 7, 1904
Brady, Samuel Dunlap. Parkersburg, W. Va.		Sept. 7, 1904
Coe, David. Rincon Antonio, Oaxaca, Mexico.		Sept. 7, 1904
French, Frederick Reginald. Cor. Laguna and Islay Sts., Santa Barbara, Cal.		Sept. 7, 1904
Fuller, Harry. Engr., The King Bridge Co., Cleveland, Ohio.		Sept. 7, 1904
Green, Rutger Bleecker. Civ. Engr., The Solvay Process Co., Detroit, Mich.	Jun. Assoc. M. M.	May 5, 1896 Oct. 5, 1898 Sept. 6, 1904
Harris, Van Allen. San Juan, Porto Rico.	Jun. Assoc. M. M.	Nov. 6, 1894 Oct. 5, 1898 Sept. 6, 1904
Hoffmann, Robert. Asst. Engr., Dept., Public Service, in Chg. of Sewers and Drains, P. O. Box 180, Cleveland, Ohio.	Assoc. M. M.	June 5, 1901 Sept. 6, 1904
Johnston, Clarence Thomas. State Engr., Cheyenne, Wyo.		Sept. 7, 1904
Nunn, Paul N. P. O. Box 3, Niagara Falls, N. Y.		Sept. 7, 1904
Redlich, Carl. Civ. Engr. and Contr., 3 Garnisonsgasse, Vienna, Austria.		Sept. 7, 1904
Riegner, Wallace Berkley. Engr. of Bridges, P. & R. Ry., 520 Reading Terminal, Philadelphia, Pa.		Sept. 7, 1904
Scofield, Glenn Mason. Secy. and Treas., The Scofield Co., 906 Pennsylvania Bldg., Philadelphia, Pa.		Sept. 7, 1904
Strehlow, Oscar Emil. U. S. Asst. Engr., South Bend, Ind.	Assoc. M. M.	Mar. 6, 1901 Sept. 6, 1904

ASSOCIATE MEMBERS.

Bliss, George Henry. Asst. Engr., U. S. Geological Survey, Reclamation Service, Box 542, North Yakima, Wash.	Sept. 7, 1904
Booth, George William. Northboro, Mass.	Sept. 7, 1904
Bowen, Sherman Worcester. 5945 Cote Brilliante Ave., St. Louis, Mo.	Sept. 7, 1904
Buffinton, Benjamin Thomas. (Wolstenholme & Buffinton), Fall River, Mass.	Sept. 7, 1904

	Date of Membership.
COLE, EDWARD SMITH. Cons. Engr., The Pitometer Co., 220 Broadway, New York City	Sept. 7, 1904
HILLER, JOHN AUGUSTUS. 2385 Eastern Ave., Cincinnati, Ohio	Sept. 7, 1904
LAMB, ERNEST AVERY. 385 Hudson Ave., Albany, N. Y.	Sept. 7, 1904
LAVELLE, THOMAS MONAHAN. Engr., Yards and Bldgs., Am. Bridge Co., Ambridge, Pa.	Sept. 7, 1904
LOVETT, GEORGE FREDERICK. Care, Finch, Pruyn & Co., Box 185, Glens Falls, N. Y.	Sept. 7, 1904
McCURDY, HARRY SHERWOOD ROYDEN. 15 Beacon St., Boston, Mass.	Sept. 7, 1904
OPDYCKE, HENRY GORTON. 310 West 97th St., New York City.	Sept. 7, 1904
THOMPSON, CLARENCE HARD. 211 Shonnard St., Syracuse, N. Y.	Sept. 7, 1904
VOYNOW, CONSTANTINE BORISSON. Asst. Engr., Phil. Rap. Trans. Co., 9th and Dauphin Sts., Philadelphia, Pa.	Sept. 7, 1904
WILLIAMS, PARLEY LYCURGUS, Jr. Supt., Highland Boy Mines, Utah Cons. Min. Co., Bingham, Utah	Sept. 7, 1904

ASSOCIATES.

DAILEY, JOHN ALEXANDER. 40 Sanford St., East Orange, N. J.	Sept. 7, 1904

JUNIORS.

BLACKBURN, NATHANIEL TOWNSEND. U. S. Engr. Office, Galveston, Tex.	Sept. 6, 1904
DECKER, JOHN HULL. Care, The Atlantic City Sewerage Co., 231 Bartlett Bldg., Atlantic City, N. J.	Sept. 6, 1904
DUDLEY, CHARLES TARBELL. 1010 Mutual Bank Bldg., San Francisco, Cal.	Sept. 6, 1904
EITZEN, ARTHUR ROBERT. Columbia, Mo.	Sept. 6, 1904
FOX, HENRY HEYWOOD. 99 Irving St., Cambridge, Mass	Sept. 6, 1904
HALL, ROBERT ELLIOT. 4 South St., Auburn, N. Y.	Sept. 6, 1904
HAWKESWORTH, JOHN. 10 Jay St., New York City	Sept. 6, 1904
HOWARD, CLEMENT JOHN. U. S. Engr. Office, Galveston, Tex.	Sept. 6, 1904
MAGRUDER, FRANK CECIL. Care, U. S. Geological Survey, Belle Fourche, S. Dak	Sept. 6, 1904
ROBERTS, ALFRED WHEELER. 411 Fairmount Ave., Jersey City, N. J.	April 5, 1904

CHANGES OF ADDRESS.

MEMBERS.

BELL, GILBERT JAMES	Asst. Engr., A., T. & S. F. Ry., 1222 East Tenth St., Kansas City, Mo.
BIDDLE, WILLIAM FOSTER	209 South 3d St., Philadelphia, Pa.
BISBEE, FRED MILTON	Acting Engr., Western Grand Div., A., T. & S. F. Ry., La Junta, Colo.
BRECKINRIDGE, WILLIAM LEWIS	Engr., C., B. & Q. Ry., Lines East of Missouri River, Chicago, Ill.

Bryson, Andrew....................Pres., Brylgon Steel Casting Co., New Castle, Del.

Butler, Matthew Joseph..........Asst. Chf. Engr., Transcontinental Ry., Ottawa, Ont., Canada.

Chambers, Frank Taylor..........Civ. Engr., U. S. N., Navy Dept., Washington, D. C.

Coleman, Frederick Albert.......3175 Euclid Ave., Cleveland, Ohio.

Frank, George William...........P. O. Box 333, Liberty, Sullivan Co., N. Y.

Fulton, John Addison.............92 Marston Ave., Detroit, Mich.

Harrison, Charles Lewis..........Prin. Asst. Engr., East River Div., P., N. Y. & L. I. R. R., 1 West 34th St., New York City.

Linville, Jacob Hays ....Cons. Engr., 817 South 48th St., Philadelphia, Pa.

Loree, Leonor Fresnel...........Care, Hoffman House, New York City.

Miller, Harvey Cooper............(H. C. Miller & Co., Engrs. and Contrs.), 1 Madison Ave., New York City.

Morris, Henry Gurney............Engr. and Machinist, 333 Walnut St., Philadelphia, Pa.

Olmsted, Ashbel Edward..........Div. Engr., Rapid Transit Subway Constr. Co., 500 West 143d St., New York City.

Pew, Arthur......................Pres., The South Georgia Eng. Co., 34 Moreland Ave., Atlanta, Ga.

Raymond, Charles Ward...........1560 Sacramento St., San Francisco, Cal.

Ross, Alexander Bell.............7 Walmer Rd., Toronto, Ont., Canada.

Sherman, Charles Winslow........Asst. to Leonard Metcalf, Cons. Engr., 14 Beacon St., Boston, Mass.

Souder, Harrison ....Harrison Bldg. (Res. 4435 Sansom St.), Philadelphia, Pa.

Spring, Francis Joseph Edward....Chairman, Harbor Trust Board, Madras, India.

Weiskopf, Samuel C...............Cons. Engr., 68 William St., New York City.

Whittemore, Don Juan............Chf. Engr., C., M. & St. P. Ry. Co., 1345 Railway Exchange, Chicago, Ill. (Res., 222 Biddle St., Milwaukee, Wis.).

Williams, Chauncey Grant........Lynchburg, Va.

ASSOCIATE MEMBERS.

Baum, George.....................Care, Westinghouse, Church, Kerr & Co., Woodhaven Junction (Res., 109 Beech St., Morris Park), N. Y.

Burden, Morton ....Care, Am. Bridge Co., 802 Frick Bldg., Pittsburg, Pa.

Carney, Edward Joseph............Dept. of Bridges, 19 Park Row (Res., 305 West 104th St.). New York City.

Carter, Alfred Ellsworth	449 West 123d St., New York City.
Carter, Richard William	Miami, Fla.
Connor, William Durward	Capt., Corps of Engrs., U. S. A., Staff Coll., Fort Leavenworth, Kans.
Cresson, Benjamin Franklin, Jr.	Engr. of Alignment, North River Div., P., N. Y. & L. I. R. R., 558 West 33d St., New York City.
Davis, Carleton Emerson	Engr., Water-Works and Sewers, Isthmian Canal Comm., Ancon, Canal Zone, Panama.
Davis, Fred Rufus	Corps of Engrs., National Board of Fire Underwriters, 1008 Banigan Bldg., Providence, R. I.
Duncan, Lindsay	821 Ernest & Cranmer Bldg., Denver, Colo.
Greenalch, Wallace	Supt., Bureau of Water, Albany, N. Y.
Haines, Eugene Grove	Asst. Engr., Rapid Transit R. R. Comm., Battery Park, New York City.
Harte, Charles Rufus	Asst. Engr., N. Y., N. H. & H. R. R., 168 Olive St., New Haven, Conn.
Hasskarl, Joseph Frederick	Supt. of Constr., U. S. Engr. Dept. (Res., 1603 West Girard Ave.), Philadelphia, Pa.
Hawley, George Prince	Care, Shawinigan Water & Power Co., Montreal, Que., Canada.
Hill, Walter Arthur	Engr., M. of W. and Constr., Veracruz & Pacific R. R., Orizaba, Veracruz, Mexico.
MacCracken, George Gere	32 Park Pl., New York City.
MacGregor, John Grant	Chf. Engr.'s Office, Guelph & Goderich Ry., Goderich, Ont., Canada.
McClure, John Clarendon	Engr., M. of W., Gila Val., Globe & North. Ry., and Maricopa & Phœnix and Salt River Val. Ry., Tucson, Ariz.
Matthes, François Emile	54 Garden St., Cambridge, Mass.
Pfeifer, Herman Julius	Gen. Supt. of Constr., Street Dept., 2145 Blendon Pl., St. Louis, Mo.
Phillips, Theodore Clifford	304 Bowen Ave., Chicago, Ill.
Pitts, Thomas Dorsey	45 Broadway, New York City.
Schmitz, Frank Curtiss	Care, Columbian Fireproofing Co., 26 West 26th St., New York City.
Shima, Takejiro	Care, Takata & Co., 10 Wall St., New York City.
Spencer, John Clark	Care, Am. Bridge Co., 802 Frick Bldg., Pittsburg, Pa.
Stewart, Clinton Brown	Univ. of Wisconsin, Madison, Wis.
Vogleson, John Albert	Asst. Engr. in Chg. of Roxboro and Belmont Filters, Bureau of Filtration, Ford Rd. and Belmont Ave., Philadelphia, Pa.

Williams, Walter Scott	509 Hitt St., Columbia, Mo.
Wright, Joseph Bodine	605 West 115th St., New York City.

ASSOCIATES.

Karner, William Josiah	Acting Chf. Engr., Isthmian Canal Comm., Ancon, Canal Zone, Panama; Care, New York Post Office.
Turrill, Sherman Marsh	54 Church St., Bethlehem, Pa.

JUNIORS.

Becker, Sylvanus A	840 Delaware Ave., So. Bethlehem, Pa.
Belzner, Theodore	Insp,. Steel Constr., East Side Viaduct, Sec. 10, Fourth Div., Rapid Transit R. R. Comm., 231 West 125th St. (Res., 301 West 150th St.), New York City.
Brisley, Edward Betts	Hotel Walton, 70th St. and Columbus Ave., New York City.
Duller, David Mark	Houston, Tex.
Hanna, Walter Scott	Care, The Board of Public Service, Columbus, Ohio.
Hood, John Mifflin, Jr	1231 N. Calvert St., Baltimore, Md.
Howes, Ralph Holt	Civ. Engr., Wells Bros. Co. of New York, The Snowdon, James St., Syracuse, N. Y.
Lindsey, Kieffer	P. O. Box 242, Canastota, N. Y.
Macdonald, Archibald Angus	111 Fifth Ave., New York City.
Melick, Neal Albert	16 West 128th St., New York City.
Paraschos, George Theophanes	Bureau of Filtration, Aspinwall, Allegheny Co., Pa.
Pearse, Langdon	Care, Board of Public Service, Columbus, Ohio.
Ryder, Ely Morgan Talcott	Instr. in Civ. Eng., Sheffield Scientific School, Box 671, Yale Station, New Haven, Conn.
Spencer, Louis Bernard	Cons. Engr., Ogden, Utah.
Tilt, Garret Edward	19 Hatfield Pl., Port Richmond, N. Y.
Van Brakle, John Ogden	210 West 106th St., New York City.

DEATHS.

McGee, Van Norman	Elected Associate Member, June 6th, 1900; died September 28th, 1904.
Miller, Alexander Macomb	Elected Member, June 6th, 1888; died September 14th, 1904.
Pratt, William Arthur	Elected Member, December 4th, 1895; died September 19th, 1904.
Shirreffs, Reuben	Elected Member, June 4th, 1890; died August 31st, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(September 11th to October 10th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*. London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*, Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E. London, England.
(64) *Power*, New York City, 20c.
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.
(69) *Mill Owners*, New York City, 10c.
(70) *Engineering Review*, New York City, 10c.
(71) *Journal*, Iron and Steel Inst., London, England
(72) *Street Railway Review*, Chicago, 30c.
(73) *Electrician*, London, England, 18c.
(74) *Transactions*, Inst. of Min. and Metal., London, England.
(75) *Proceedings*, Inst. of Mech. Engrs., London, England.
(76) *Brick*, Chicago, 10c.
(77) *Journal*, Inst. Elec. Engrs., London, England.

LIST OF ARTICLES.

Bridge.

Highway Bridges. C. M. Canady. (58) June.
Plate Girder Webs. (12) Sept. 9.
The American Bridge Company's Ambridge Works: The Eye Bar Shop.* (20) Sept. 15.
Design in Relation to the Durability of Bridges. (12) Sept. 16.
An Interesting Draw Bridge Built Mostly of Wood in Forty Working Days.* Martin Schreiber. (72) Sept. 20.
Bridge Renewal Under Unusual Conditions.* (13) Sept. 22.
The Sydney Harbor Bridge, Australia.* (13) Sept. 22.
The Tula and the Chone River Bridges, Mexico.* (14) Sept. 24.
New Bridges at Como Park, St. Paul.* (17) Sept. 24.
Handling Traffic During Bridge Construction in Portland, Oregon.* (17) Sept. 24.
Rebuilding a Wrecked Railroad Bridge at Easton, Pa.* (14) Oct. 1.

Electrical.

The Phipps Power Building.* Gerald E. Flanagan. (58) Aug.
Description of the Electrical Equipment of an Engine Works and Shipyard, with Notes Thereon. H. O. Wraith, Assoc. M. I. E. E. (77) Aug.
A Theoretical Consideration of the Currents Induced in Cable Sheaths, and the Losses Occasioned Thereby. M. B. Field, M. I. E. E. (77) Aug.
Some Uses of the Oscillograph.* D. K. Morris, M. I. E. E., and J. K. Catterson-Smith. (77) Aug.
The Equipment of an Engine Test-House.* R. K. Morcom, M. I. E. E. (77) Aug.
Answers to Questions Relative to High-Tension Transmission (by Committee of Amer. Inst. E. E.) (42) Sept.
Experiments on Sheath Losses of Three-Core Cables.* J. T. Morris. (73) Sept. 2.
Some Recent Long-Distance Submarine Telephone Cables.* F. Breisig. (Abstract of Paper read before the Elektrotechnischer Verein of Berlin.) (73) Sept. 2.
Electricity from Water-Power. A. A. Campbell Swinton. (Paper read before the British Assoc. for the Advancement of Science.) (26) Sept. 2; (73) Sept. 2; (47) Sept. 10; Abstract (12) Sept. 2.
The Puget Sound Power Company.* (12) Serial beginning Sept. 2.
Electric Harbour Cranes.* (26) Sept. 2.
Energy Losses in Magnetising Iron.* W. M. Mordey and A. G. Hansard. (Paper read before the British Assoc. for the Advancement of Science.) (73) Sept. 2; Abstract (12) Sept. 2.
A 100-Mile Transmission Line. Robert Howes. (Abstract of Paper read before the National Elec. Light Assoc. of America.) (73) Sept. 2.
Management of Dynamos. (47) Sept. 3.
The Use of Electricity on the North-Eastern Railway and upon Tyneside.* Charles H. Merz and William McLellan. (Paper read before the British Assoc. for the Advancement of Science.) (12) Sept. 9.
How Message Wires are Guarded on the Continent. M. Petit. (26) Sept. 9.
Experiments for Improving the Construction of Practical Standards for Electrical Measurements. (Abstract of Com. Rept. of the British Assoc. for the Advancement of Science.) (73) Sept. 9.
Series Running of Enclosed Arcs. H. Stafford Hatfield. (73) Sept. 9.
The Installation of Electric Cables.* H. W. Buck. (Paper read before the Electric Club.) (73) Sept. 9.
The Westinghouse Oil Switches for High-Tension Circuits.* (26) Sept. 9.
The Prevention of Accidents in Handling Electrical Apparatus. (26) Sept. 9.
The Hopkinson Test as Applied to Induction Motors.* W. E. Sumpner and R. W. Weekes, M. I. E. E. (Paper read before the British Assoc. for the Advancement of Science.) (26) Sept. 9; Abstract (73) Sept. 9.
North Metropolitan Electric Power Supply and Tramways.* (26) Serial beginning Sept. 9.
The Northern California Power Company's Systems.* (27) Serial beginning Sept. 10.
Storage Battery Exhibit at St. Louis.* (27) Sept. 10.
The Turbo-Electric Power System in Paint Manufacture.* (27) Sept. 10.
The Inspection and Insurance of Electrical Machinery.* Michael Longridge, M. Inst. C. E. (47) Sept. 10.
The Design of Dynamos. A. Press. (26) Sept. 16.
The Reaction of the Radiation on a Moving Electron. M. Abraham. (Paper read before the British Assoc. for the Advancement of Science.) (73) Sept. 16.
The Twickenham and Teddington Electricity Undertaking.* Max. J. E. Tilney. (73) Sept. 16.
Raising and Lowering Gear for Arc Lamps.* Donald Smeaton Munro. (26) Sept. 16.
The Magnetic Reluctance of Air Cores in Short Coils.* W. M. Thornton. (73) Sept. 16.
The Propagation of Electric Waves Along Spiral Wires and on an Appliance for Measuring the Length of Waves used in Wireless Telegraphy. J. A. Fleming. (Abstract of Paper read before the British Assoc. for the Advancement of Science.) (73) Sept. 16.
Medium-Span Line Construction.* C. A. Copeland. (Paper read before the Pacific Coast Elec. Transmission Assoc.) (73) Sept. 16.
The New Building for the General Electric Machine Shop and Power House, Lynn.* (14) Serial beginning Sept. 17.

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* Illustrated.

Electrical—(Continued).

The Maintenance Organization on the Bay Counties Power Co.'s Works.* (14) Sept. 17.

Design of Armature Coils.* (27) Sept. 17.

A New System for Securing Secrecy in Wireless Telegraph Signaling.* Emile Guarini. (19) Sept. 17.

The Malcotti Telecryptograph for Telegraphing upon Telephone Lines.* Emile Guarini. 46 Sept. 17.

The Jungner Nickel-Iron Accumulator and its Origin.* M. V. Schoop. (19) Sept. 17.

Hydraulics in Connection with Electric Railway Work. B. E. Morrow. (72) Sept. 20.

Large Bulb Incandescent Electric Lamps as Secondary Standards of Light. J. A. Fleming. (Abstract of Paper read before the British Assoc. for the Advancement of Science.) (29) Sept. 23.

On the Heating of Three-Phase Cable Sheaths.* M. B. Field. (26) Sept. 23.

The Care of Switchboards. (26) Sept. 23.

The Three-Phase 40 000-Volt Power Transmission from Gromo to Nembro (Lombardia).* (26) Sept. 23.

The Willesden Power House of the North Metropolitan Electric Power Supply Co.* (73) Serial beginning Sept. 23.

The Duplex Balancing of Telegraph Cables.* W. Gaye. (73) Serial beginning Sept. 23.

The Starting of the Heyland Single-Phase Induction Motor.* A. Boyd. (73) Sept. 23.

The Electromotive Force of the Clark Cell. (73) Sept. 23.

On the Predetermination of Plunger Electromagnets.* Silvanus P. Thompson. (Paper read before the International Elec. Congress.) (73) Sept. 23.

A 16-Mile 80 000-Volt Experimental Electric Transmission Line. A. C. Balch. (Paper read before the Pacific Coast Elec. Transmission Assoc.) (73) Sept. 23.

Report on High Voltage Transmission Lines (to the St. Ry. Assoc. of the State of N. Y.) (17) Sept. 24.

Testing of Large Capacity Induction Wattmeters. E. W. Gough. (27) Sept. 24.

American Practice in High-Tension Line Construction and Operation. F. A. C. Perrine. M. Am. Inst. Elec. E. (Abstract of Paper presented before the International Elec. Congress.) (13) Sept. 29.

The Puyallup River Water Power Development near Tacoma, Washington.* (13) Sept. 29; (14) Oct. 1; (27) Serial beginning Oct. 1.

Aluminium Electrical Conductors. Roderick J. Parke. (Abstract of Paper read before the Canadian Elec. Assoc.) (26) Sept 30.

A New Electro-Chronograph.* David Owen. (73) Sept. 30.

Electrolytic Receivers in Wireless Telegraphy. Lee de Forest. (3) Oct.

Telpherage.* C. J. Messer. (3) Oct.

Speed Control of Motors.* Norman Gardner Meade. (64) Oct.

The Service Power Plant at the World's Fair.* (41) Oct.; (18) Oct. 1; (15) Oct. 7.

Power Station Equipment for the World's Fair, St. Louis.* (27) Oct. 1.

Electric Motors in Machine Shop Service. (14) Oct. 1.

Speed Regulation in Combined Steam and Hydraulic Power Systems. (14) Oct. 1

The 5 000-Horse-Power Three-Phase Turbo-Alternator at the Porta Volta Electric Supply Station of Milan.* (19) Oct. 1.

The Yorkshire and Lancashire Electric Power Companies.* (Abstract of Paper read before the International Elec. Congress.) (14) Oct. 8.

A Gas Engine Harbor Electric Plant.* (27) Oct. 8.

The Works of the Ontario Power Company of Niagara Falls.* (14) Serial beginning Oct. 8.

Mercadier's System of Attuned Telegraphy.* (Translated from *Prometheus*.) (19) Oct. 8.

Expériences sur les Courants Continus à Haute Tension.* (33) Sept. 17.

Séparation de l'Huile des Eaux de Condensation par le Courant Électrique.* (33) Sept. 24.

Les Alternateurs Westinghouse.* F. Gramyr. (36) Sept. 25.

Sur l'Établissement Rationnel des Dynamos. C. F. Guilbert. (From *Bulletin trimestriel* de la Société amicale d'ingénieurs sortant de l'école supérieure d'Electricité.) (36) Sept. 25.

Marine.

Description of the Electrical Equipment of an Engine Works and Shipyard, with Notes Thereon. H. O. Wraith, Assoc. M. I. E. E. (77) Aug.

The Austrian Lloyd's Steamer *Africa*.* (11) Serial beginning Sept. 2.

The Indian Troopship *Dufferin*. (12) Sept. 16.

Launch of the First Turbine-Propelled Liner for Transatlantic Traffic. (46) Sept. 17.

Steam Turbine Propulsion for Marine Purposes. A. Rateau. (Paper read before the Inst. of Naval Archts.) (19) Serial beginning Sept. 17.

The Design of a Launch Motor.* Edward Butler, M. I. M. E. (47) Serial beginning Sept. 24.

The Design of a Dry Dock.* Alfred W. Young. (Paper read before the Junior Inst. Engrs.) (11) Sept. 30.

Auxiliaries of a War Fleet; with Special Reference to Recent Additions to the British Navy.* Archibald S. Hurd. (10) Oct.

Launching of the *Connecticut* and *Milwaukee*.* (46) Oct. 1.

The Launching of the U. S. Battleship *Connecticut*.* (20) Oct. 6.

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* Illustrated.

Marine—(Continued).

Italian First-Class Battleship *Regina Margherita*.* (**19**) Oct. 8.
Some New Types of Lifeboats.* (**46**) Oct. 8.
Peary's New Ship for Work in Arctic Seas.* (**46**) Oct. 8.
Ponts Roulants Électriques, pour Cales de Construction de Navires.* (**34**) Sept.

Mechanical.

Inertia in Gas and Steam Engines.* A. T. Kasley. (**58**) July.
A Simple Dynamometer.* W. J. Spiro. (**6**) July.
The Utilization of the By-Products in the Manufacture of Portland Cement. Bernard Enright. (**67**) Aug.
Flame Temperatures in Internal Combustion Engines. (**22**) Aug. 26; (**26**) Sept. 2.
The Utilisation of Waste Heat from Coke Ovens. (**22**) Aug. 26.
The Aerial Ropeway at Aberfeldy.* (**12**) Sept. 2.
The Utilisation of Coke Oven Gas.* (**12**) Sept. 2.
Tandem Compound Drop Valve Steam Engine.* (**12**) Sept. 2.
The Zoelly Steam Turbine.* Walter Rappaport. (**26**) Sept. 22.
The Calorimetry of Gaseous Fuels.* W. Garnet Wernham. (Abstract of Paper read before the Junior Inst. of Engrs.) (**47**) Sept. 3.
Flame Temperatures in Internal-Combustion Motors.* Dugald Clerk. (Paper read before the British Assoc. for the Advancement of Science.) (**47**) Serial beginning Sept. 3.
The Effects of Receiver Drop in a Compound Engine. Joseph W. Hayward. (Paper read before the British Assoc. for the Advancement of Science.) (**47**) Sept. 3; (**73**) Sept. 16.
Machine Tools at St. Louis Exhibition.* (**22**) Sept. 9.
The Prevention of Heat Radiation from Steam Pipes.* Francis H. Davies. (**73**) Sept. 9
A New Oil Engine.* (**12**) Sept. 9.
Notes on American Steel Works.* David E. Roberts, M. Inst. C. E. (**11**) Serial beginning Sept. 9.
The Turbo-Electric Power System in Paint Manufacture.* (**27**) Sept. 10.
Effective Steam Plants for Gas Manufacture. C. H. Pennoyer. (Paper read before the Pacific Coast Gas Assoc.) (**24**) Sept. 12.
Boiler Scale and the Transmission of Heat.* A. D. Risteen. (**62**) Sept. 15.
A Bricking Plant for Flue Dust and Fine Ores.* Jas. C. Bennett. (**16**) Sept. 15.
Tests of an Oil Engine with Steam Injection.* (**13**) Sept. 15.
The 40-Ton Guy Derricks at the New Wanamaker Store, Philadelphia, Pa.* (**13**) Sept. 15.
Latest Design of American Steel Plant for the Production of Billets.* (**22**) Sept. 16.
The Clarkson Steam-Motor Omnibus.* (**12**) Sept. 16.
Trial of a 240-H. P. Diesel Oil Engine.* Michael Longridge, M. Inst. C. E. (**47**) Sept. 17.
The Crocker Steam Turbine. (**47**) Sept. 17.
Proportions of the Mechanical Equipment of the Whitehall Building, New York.* (**14**) Sept. 17.
A Molasses Pumping Plant in Boston.* (**14**) Sept. 17.
Compressed Air and Pneumatic Tools in Engineering Works. Frank Fielden. (**62**) Sept. 22.
A Forty-Passenger Automobile.* (**20**) Sept. 22.
Standard and Systematic Methods for Making Beds.* Thomas D. West. (Paper read before the Amer. Foundrymen's Assoc.) (**11**) Sept. 23.
The Manufacture of Small Briquettes.* Dr. Steger. (From *Stahl und Eisen.*) (**57**) Sept. 23.
Valve Motion: Its Relation to Steam Economy.* (Abstract of Paper read before the Traveling Engineers' Assoc.) (**40**) Sept. 23.
Imperial Works of the Oil Well Supply Co., Oil City, Pa.* (**14**) Sept. 24.
Suction Gas Producers.* Oskar Nagel. (**27**) Sept. 24
An Automatic Lamp Lighting and Extinguishing Device.* Alfred Gradenwitz. (**19**) Sept. 24.
Turbine Testing Plant of the Westinghouse Machine Co.* (**14**) Sept. 24.
Internal Combustion Engines at the St. Louis Exposition.* (**27**) Sept. 24.
Some Practical Observations on the Flow of Gases in Pipes. (**24**) Sept. 26.
Reeves Engine Tests.* (**62**) Sept. 29.
30-Inch Double Boring and Turning Mill.* (**12**) Sept. 30.
The Utilisation of Peat.* (**22**) Sept. 30.
The Economy of Feed Water Heating. (**64**) Oct.
A Solution of an Important Gas Engine Problem. (**64**) Oct.
Steam Turbine Construction.* O. Lasche. (**64**) Oct.
The Riedler-Stumpf Turbine and its Applications.* (**64**) Oct.
Portland Cement Crushing and Grinding Machinery.* Boilleau and Lyon. (**60**) Oct.
Fuel Gas for Internal Combustion Engines: Notes upon its Generation and Uses.* J. R. Bibbins. (**10**) Oct.
Condensing Plant: Types of British Condensers and Accessories.* W. H. Booth. (**10**) Serial beginning Oct.
Important Improvements in Planer Design. (**25**) Oct.

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Mechanical—(Continued).

The Fuel Briquetting Industry: the Materials of which Briquets are Made, Binders, Fuel Value, Shapes of Briquets, Processes and Machinery Used.* John Fulton. (**45**) Oct.
Lathe Centers.* Frank Kleinhans. (**41**) Oct.
The Practical Working of High-Speed Steels. Thomas Beasley. (**41**) Oct.
The Giant Establishment of M. M. Schneider & Co., in France.* L. Ramakers. (**41**) Oct.
Oil Burning Furnaces.* S. Uren. (Paper read before the Nat. R. R. Master Blacksmiths' Assoc.) (**18**) Oct. 1; Abstract (**15**) Sept. 30; (**20**) Oct. 6.
The Construction of an Indicating or Recording Tin Plate Aneroid Barometer.* N. Monroe Hopkins. (**19**) Oct. 1.
Electric Motors in Machine Shop Service. (**14**) Oct. 1.
Retort House Practice in a Small Works. George C. Turner. (Paper read before the Michigan Gas Assoc.) (**24**) Oct. 3.
The Practical Handling of High Speed Steels. (**20**) Oct. 6.
Steel Castings. (**20**) Oct. 6.
Proportions of the Mechanical Plant of the North American Building, New York.* (**14**) Oct. 8.
Temperature as Applied to the Production and Purification of Coal Gas.* V. F. Dewey. (Paper read before the Michigan Gas Assoc.) (**24**) Oct. 10.
The Formation of Naphthaline in Coal Gas. Alfred H. White and S. Ball. (Paper read before the Michigan Gas Assoc.) (**24**) Serial beginning Oct. 10.
L'Élévateur-Transporteur Extensible *Condor*, Employé à la Construction de l'Hotel des Postes et Télégraphes de Gand; Systeme Ch. van Driessche. (**30**) Aug.
La Fabrication des Chaines sans Soudure par le Procédé Belge du Laminage Annulaire.* Eug. François. (**30**) Aug.
Fonctionnement de la Vapeur Surchauffée dans les Machines à Pistons.* F. Richter. (**37**) Sept.
La Force Motrice à l'Exposition de Saint Louis: Installation des Générateurs de Vapeur.* L. Piaud. (**33**) Sept. 3.
Installations Mécaniques et Frigorifiques de l'Hôtel Astor, à New-York.* (**33**) Sept. 10.
Les Nouvelles Usines Cail, à Denain (Nord): Société Française de Constructions Mécaniques.* D. Dantin. (**33**) Serial beginning Sept. 24.
La Turbine à Vapeur Zoelly.* (**33**) Sept. 24.
Élévateurs et Grues Électriques.* C. Domar. (**36**) Sept. 25.
Les Voitures Peugeot.* F. Doubrey. (**36**) Sept. 25.

Metallurgical.

Sixth Report to the Alloys Research Committee: On the Heat Treatment of Steel.* William C. Roberts-Austen and William Gowland. (**75**) No. 1, 1904.
A Crucible Charge for Gold and Silver in Zinc Ores. E. J. Hall and E. Popper. (**6**) July.
Methods of Pyrometry.* C. W. Waidner. (**58**) Sept.
Conduit System of Handling Blast Furnace Stock.* (From *Iron Trade Review.*) (**47**) Sept. 3.
The Tube Mill in the Transvaal. (**12**) Sept. 9.
The Theory of the Hot Blast. A. D. Elbers. (**62**) Sept. 15.
Effects of Annealing on Steel Rails. Thomas Andrews, M. Inst. C. E., and Charles Reginald Andrews. (**62**) Sept. 22.
Pig-Iron in its Commercial Aspects. F. M. Thomas. (Abstract of Lecture before the Birmingham Metallurgical Soc.) (**22**) Sept. 23.
Specifications for British Foundry Iron. (**22**) Sept. 23.
Modern Blast Furnace Construction: From the Drawing Office Point of View. J. G. Bayley. (**20**) Sept. 29.
Ore Mills at the Louisiana Purchase Exposition: The Working Mills and Models Exhibited by California, Utah and South Dakota.* (**45**) Oct.
The Portland Mill: A Description of the Chlorination Plant of the Portland Gold Mining Co., at Colorado Springs, Colo. F. A. Thomson and S. L. Goodale. (**45**) Serial beginning Oct.
Influence of Tempering on the Electric Resistance of Steel. H. Le Chatelier. (Paper read before the Académie des Sciences.) (**19**) Oct. 1.
The Determination of Carbon, with Special Reference to the Stability of Carbon Compounds in Steel.* James A. Aupperle. (**20**) Oct. 6.
Chlorine in Metallurgy. James Swinburne. (Abstract of Paper read before the International Electrical Congress.) (**13**) Oct. 6.
La Fabrication du Fer et de l'Acier au Four Électrique.* L. Gautier. (**34**) Sept.
Recherches sur les Aciers au Titane et à l'Étain.* Léon Guillet. (**33**) Sept. 17.

Military.

Electrically-Operated Submarine Mines.* Waldon Fawcett. (**26**) Sept. 2.
Electric Night Sights.* (**26**) Sept. 9.

Mining.

Safeguards in Bituminous Coal Mining. W. E. Fohl. (**58**) July.
Underground Wire-Rope Haulage.* (**22**) Aug. 26.

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Mining—(Continued).

Mine Signalling by Compressed Air.* (**22**) Sept. 2.
The Applications of Electricity at the Pinxton Collieries.* (**73**) Sept. 9.
Timber and Timbering.* J. H. Batcheller. (**16**) Serial beginning Sept. 15.
The South Wilkes-Barre Colliery.* (**16**) Sept. 22.
Improvements at the Birley Collieries.* (**22**) Sept. 23.
Pillar Working in Bengal, India. Geo. A. Stonier. (Paper read before the Inst. of Min. Engrs.) (**57**) Sept. 23.
Oil-Engine, Driven, Pumping and Electric Lighting Plant at Syndale Colliery. Thos. Beach. (Paper read before the National Assoc. of Colliery Managers.) (**22**) Sept. 30.
Large Blasting Operations in Slate Quarries.* (**22**) Sept. 30.
The Problem of Dynamic Balance. E. H. Roberton. (Paper read before the Inst. of Min. Engrs.) (**57**) Sept. 30; (**22**) Sept. 16.
The Henry Colliery of the Davis Coal & Coke Company: A Description of the Plant and the Mechanical Equipment.* J. F. Healy. (**45**) Oct.
Suspension des Câbles Électriques dans les Mines.* (**34**) Sept.

Miscellaneous.

The National Physical Laboratory: Recent Researches and Future Work. R. T. Glazebrook. (Abstract of Paper read before the British Assoc. for the Advancement of Science.) (**73**) Sept. 2.
The Outlook for Engineering Education. C. Frank Allen, M. Am. Soc. C. E. (Address before the Soc. for the Promotion of Eng. Education.) (**40**) Sept 16; Abstract (**13**) Sept. 15.

Municipal.

A Rolling Lift Road.* (**67**) Sept.
The Development and Importance of Fire Calls and Alarms. James Sheppard, A. I. E. E. (Abstract of Paper read before the International Fire Service Congress.) (**26**) Sept. 23.
Street Lighting. A. S. Hatch. (Paper read before the International Assoc. of Mun. Electricians.) (**60**) Oct.

Railroad.

High-Speed Electric Railway Experiments on the Marienfelde-Zossen Line.* Alexander Siemens, M. I. E. E. (**77**) Aug.; Abstract (**25**) Oct.
Special Tools in the Elkhart Shops of the L. S. & M. S. Ry.* (**39**) Sept.
Report of Tank Car Committee, M. C. B. Association.* (**39**) Sept.; (**15**) Sept. 23.
Clearance Reducing Valve Mechanism and Cylinder.* (**39**) Sept.
Dining-Car for the Great Western Railway.* (**11**) Sept. 2.
New "High-Capacity" Freight Wagons of the Lancashire and Yorkshire Railway.* (**22**) Sept. 2.
Four-Cylinder Compound Locomotive.* (**12**) Sept. 9.
The Use of Electricity on the North-Eastern Railway and upon Tyneside.* Charles H. Merz and William McLellan. (Paper read before the British Assoc. for the Advancement of Science.) (**12**) Sept. 9.
The Exhibit of the "Big Four Route" at the St. Louis Exhibition.* H. W. Hanbury, M. Inst. C. E. (**11**) Serial beginning Sept. 9.
New Type of Compound Locomotive, Adriatic System, of Italy.* (**18**) Sept. 10.
Further Use of Steel and Reinforced Concrete Ties.* (**18**) Sept. 10.
German High-Speed Compound Locomotive at the St. Louis Exhibition.* (**13**) Sept. 15.
Locomotive Coaling Station for the Central Railroad of New Jersey.* (**15**) Sept. 16; (**40**) Sept. 16.
The Westinghouse Automatic Air and Steam Coupler.* (**15**) Sept. 16; (**40**) Sept. 16; (**25**) Oct.
United States Standard Postal Car.* (**40**) Sept. 16.
Mallet Locomotive, St. Louis Exhibition.* (**12**) Sept. 16.
Henschel Three-Cylinder Compound Locomotive.* (**40**) Sept. 16.
The Southern Pacific Flat-Bottom Tieplate. (**40**) Sept. 16.
Rail Fastenings. A. Morrison. (Paper read before the Roadmasters' and M. of W. Assoc.) (**40**) Sept. 16; Abstract (**15**) Oct. 7.
Track Improvements and Maintenance Expenses. E. E. R. Tratman. (Paper read before the Roadmasters' and M. of W. Assoc.) (**40**) Sept. 16.
Modern Locomotives at the St. Louis Exposition.* (**46**) Sept. 17.
New Design of Superheater for Locomotives.* (**47**) Sept. 17.
Effects of Annealing on Steel Rails. Thomas Andrews, M. Inst. C. E., and Charles Reginald Andrews. (**62**) Sept. 22.
Express Passenger Locomotive for the London and South-Western Railway.* (**11**) Sept. 23.
The New "High-Capacity" Rolling Stock of the Great Central Railway.* (**22**) Sept. 23.
New York Terminal Station of the Pennsylvania.* (**15**) Sept. 23; (**46**) Oct 8.
New Passenger and Freight Terminal of the Toledo Railway & Terminal Company.* (**15**) Sept. 23.
Concrete Cross-Ties on the Ulster & Delaware.* (**15**) Sept. 23; (**13**) Oct. 6.
The Sedalia Shops of the Missouri Pacific.* (**40**) Sept. 23.

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Railroad—(Continued).

Boston & Maine Ten-Wheelers.* (18) Sept. 24.
Passenger Car Ventilation System of the Pennsylvania R. R.* Charles B. Dudley. (18) Serial beginning Sept. 24.
The Passenger Car Ventilation System of the Pennsylvania Railroad.* (14) Sept. 24; (13) Sept. 29; (15) Sept. 30.
A New System for the Protection of Trains by Engine-Cab Signals.* Emile Guarini (19) Sept. 24.
Rearrangement of Tracks and Station Facilities at the Union Station, St. Louis, Mo.* (13) Sept. 29.
Motor Cars as Feeders to Railroads. A. Campiglio. (From *Bulletin* of the International Ry. Congress.) (15) Sept. 30.
The Westinghouse Automatic Coupler, Draw-Bar and Buffer for Railway Work.* (22) Sept. 30.
Six-Coupled Locomotive for the Pekin Syndicate Railways.* (11) Sept. 30.
New Locomotive Works in Canada.* (12) Sept. 30.
New Locomotives for the Southern Pacific.* (15) Sept. 30.
The Ganz Three-Phase Electric Railway System.* G. Leve. (15) Sept. 30.
Lehigh Valley Shops at Sayre.* (40) Sept. 30.
Wooden Crossties in Tropical Climates. F. J. E. Spring, M. Am. Soc. C. E. (Abstract of Report to be presented before the International Ry. Congress.) (40) Sept. 30.
The Carter Continuous Track Derail.* (40) Sept. 30.
The Development of the Compound Locomotive in England.* W. E. Dalby. (9) Oct.
Six-Coupled Passenger Locomotive, Boston & Maine Railroad.* (25) Oct.
Steam Motor Cars: Great Central Railway.* (21) Oct.
Electrical Motor Truck: North Eastern Railway.* (21) Oct.
The Adlake Acetylene Car Lighting System. Ed. L. Langworthy. (Abstract of Paper read before the Southern and South Western Ry. Club.) (21) Oct.
2nd Class Carriages: Belgian State Railways.* (21) Oct.
Uniform Code of Signalling by Detonators. (21) Oct.
8 Coupled or "Consolidated" Engines: Japanese Imperial Government Rs.* (21) Oct.
20-Ton 4-Wheeled Hopper Wagon: Great Central Railway.* (21) Oct.
Express Passenger Engines (4-4-0 Outside Cylinders Class): Great Western Railway.* (21) Oct.
Impressions of Foreign Railroad Practice. (25) Serial beginning Oct.
New Locomotive and Car Shops, McKees Rocks, Pa., Pittsburg & Lake Erie Railroad: Blacksmith Shop Equipment.* (25) Oct.
Piston Valves with Relief Plates, Pennsylvania Railroad.* (25) Oct.
The Cross-Compound Locomotive: Distribution of Power.* W. L. Kinsell. (25) Oct.
The New York Improvements of the New York, New Haven & Hartford Railroad. (14) Oct. 1.
Standard Tunnel Plans, New York Central R. R.* (18) Oct. 1.
The Locomotive Exhibits at the St. Louis Exhibition.* (13) Oct. 6.
Controlled Manual Block Signals: Illinois Central.* (40) Oct. 7.
Trolleys and Hoists in Railway Shops.* (40) Oct. 7.
Progress on the Washington Tunnel.* (15) Oct. 7.
Special Horse Car for the Central Railroad of New Jersey.* (15) Oct. 7; (40) Oct. 7; (18) Oct. 8.
Tie Plates. (Report by Com. Roadmasters' and M. of W. Assoc.) (15) Oct. 7.
New Locomotives and Motor Cars for the Paris-Orleans.* (15) Oct. 7.
Improvements on the Philadelphia, Baltimore and Washington.* (15) Oct. 7.
Tank Suburban Engine—Long Island Railroad.* (18) Oct. 8.
Le Chemin de Fer Métropolitan de Paris.* J. Hervieu. (35) Serial beginning Sept.
Rupture des Tubes Indicateurs de Niveau d'Eau, Dispositions Adoptées à la Compagnie du Nord pour Mettre le Personnel des Locomotives à l'Abri des Accidents Qui en Résultent.* M. Defauconpret. (38) Sept.
Le Tramway Électrique du Mont-Blanc: Section du Fayet-Saint-Gervais à l'Aiguille du Goûter.* G. Espitallier. (33) Sept. 3.
Les Grandes Vitesses sur les Chemins de Fer.* R. Bonnin. (36) Sept. 10.
Les Nouvelles Locomotives Compound du Chemin de Fer de Ceinture, à Paris.* F. Barbier. (33) Sept. 10.
Le Funiculaire de la Bourboule (Puy-de-Dome).* A. Dumas. (33) Sept. 17.
Le Saturateur A. Heintz pour le Chauffage par la Vapeur sans Pression.* L. Brossement. (36) Sept. 25.

Railroad, Street.

Present Electric Railway Practice. Clarence Renshaw. (58) July.
Mersey Railway: Multiple Control.* H. L. Kirker. (77) Aug.
The Best Form of Current for Light Railways. M. Pforr. (Abstract of Paper read before the International Union of Tramways and Light Rys.) (26) Sept. 2.
Side-Slip in Motor-Cars.* Horace Darwin and C. V. Burton. (Paper read before the British Assoc. for the Advancement of Science.) (11) Sept. 9.
North Metropolitan Electric Power Supply and Tramways.* (26) Serial beginning Sept. 9
A New Sub-Station on the Central London Railway.* (73) Sept. 9.
A New American Single-Phase Motor.* (73) Sept. 9.

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Railroad, Street—(Continued).

Single-Phase Railway Motors of the Oerlikon Company.* (**73**) Sept. 9.
An American Single-Phase Railway.* (**47**) Sept. 10.
History and Physical Aspects of the New York Subway.* (**15**) Sept. 16.
Traffic Features of the Subway.* (**15**) Sept. 16.
Signaling in the Subway. (**15**) Sept. 16.
The Power Equipment of the New York Subway. (**15**) Sept. 16.
Tests of the Insulation Resistance of Electric Tramway Systems and Maintenance of the Trolley Wire. (**17**) Sept. 17.
The Dayton, Covington & Piqua Traction Company.* (**17**) Sept. 17.
A Trolley for Heavy Multiple-Unit Electric Trains.* Herbert I. Bennett. (**46**) Sept. 17.
Notes on the Work of the Electric Railway Test Commission.* Will Spalding. (**72**) Sept. 20.
Hydraulics in Connection with Electric Railway Work. B. E. Morrow. (**72**) Sept. 20.
Third-Rail System of the Scioto Valley Traction Co., Columbus, Ohio.* (**72**) Sept. 20.
The Fayet-Chamonix-Martigni Electric Ry.* Enrico Bignami. (**72**) Sept. 20.
Power Facilities and Car House Practice Followed by the Public Service Corporation (of New Jersey.) (**72**) Sept. 20.
Mill Construction Car House and Office at Bristol.* (**72**) Sept. 20.
Notes on the Power Stations of the St. Louis Transit Co.* Richard M'Culloch. (**72**) Sept. 20.
McKinley Syndicate Properties of Central Illinois.* (**72**) Serial beginning Sept. 20.
Maintenance of Electric Cars and Their Equipment. H. A. Benedict. (Abstract of Paper read before the St. Ry. Assoc. of the State of N. Y.) (**72**) Sept. 20.
Block Signaling of Electric Railways with Track Circuit Control. J. B. Struble. (Paper read before the St. Ry. Assoc. of the State of N. Y.) (**72**) Sept. 20 (**17**) Sept. 24.
Vestibule Cars for Chicago Metropolitan Elevated.* (**72**) Sept. 20.
Hadfield's Special Steel Track-Work.* (**11**) Sept. 23.
South London Conduit Tram Lines.* (**12**) Sept. 23.
New Terminal Facilities at the Minnesota State Fair Grounds.* (**17**) Sept. 24.
Power Production and Distribution on the Metropolitan Street Railway System, New York. M. G. Starrett. (Paper read before the N. Y. State St. Ry. Assoc.) (**14**) Sept. 24; (**17**) Sept. 21.
Cars: Their Equipment and Maintenance (on the Nottingham System). John Aldworth. (Paper read before the Municipal Tramways Assoc. of Great Britain.) (**73**) Sept. 30; Abstract (**26**) Sept. 30.
Steel Cars for the New York Subway.* (**15**) Sept. 30; (**25**) Oct.
High Speed Electric Interurban Systems for Freight and Passengers.* Ralph Scott. (**9**) Oct.
The Power House of the Subway Division, Interborough Rapid Transit Co.. New York.* (**14**) Serial beginning Oct. 1.
Passenger Stations and Engineering Details of the New York Subway System.* (**17**) Oct. 1.
General Design and Finish of the Modern Interurban Car.* Edward C. Boynton. (**17**) Oct. 1.
New Form of Sprague-General Electric Automatic Relay Train Control for Boston Elevated Railway.* (**17**) Oct. 1.
Power Used by Brakes. (**17**) Oct. 1.
Signals in the Subway.* (**15**) Oct. 7.
Some Early Electric Railway Generators.* A. L. Rohrer. (**27**) Oct. 8.
Underground Rapid Transit in New York City.* (**27**) Serial beginning Oct. 8.
Viaduct Erection on Section 10, New York Rapid Transit Railroad.* (**14**) Oct. 8.

Sanitary.

Centrifugal Fans and Their Application to the Heating of Industrial Buildings. R. B. Hayward. (**58**) June.
French Heating Methods.* G. Debesson. (**70**) Sept.
The Ventilation of Retort Houses. Alfred Lotz. (**70**) Serial beginning Sept.
The Riker's Island Refuse Conveyor Plant.* (**14**) Sept. 17.
Refuse-Consuming and Gas-Producing Furnace.* (**47**) Sept. 24.
Reinforced Concrete Sewers in Wilmington, Del.* (**60**) Oct.
Sewage System for Mining Town.* F. A. Coleman. (**45**) Oct.
Sewage Purification Works under Construction at Minworth Greaves, England. (**14**) Oct. 8.
Experiments in Purifying Brewery Refuse. (**14**) Oct. 8.
Cleaning the Ponds in a Boston Park. (**14**) Oct. 8.
The Ventilation of the Hotel Astor, New York.* (**14**) Oct. 8.
L'Humidification des Locaux de l'Industrie Textile.* Paul Razous. (**33**) Sept. 17.
Chauffage à Eau Chaude, à Circulation Périodique ou Continue, Système Rouquand.* A. Monteilhet. (**33**) Sept. 24.

Structural.

Preliminary Report of the Committee on the Uniform Analysis of Cement and Cement Materials. W. B. Newberry, Richard K. Meade, and Ernest B. McCready. (Paper read before the Amer. Chem. Soc.) (**67**) Aug.

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Structural—(Continued).

The Twenty-four Hour Test (of Cement). P. O. Krottnaurer. (67) Aug.
A Universal Testing Machine of 300 Tons for Full-sized Structural Members.* J. H. Wicksteed, M. Inst. M. E. (Paper read before the British Assoc. for the Advancement of Science.) (12 Sept. 2; (11) Sept. 2; (47) Sept. 17.
The Fracture of Structural Steel under Alternating Stresses.* John Oliver Arnold. (Paper read before the British Assoc. for the Advancement of Science.) (12) Sept. 2; (47) Sept. 24.
Plate Girder Webs. (12) Sept. 9.
The Power Plant of Tall Office Buildings. (26) Serial beginning Sept. 16.
Notes on Fireproofing City Buildings. Perez M. Stewart. (Abstract of Paper read before the International Assoc. of Fire Engrs.) (13) Sept. 22.
Stresses in Thin Cylinders Subjected to Internal Pressure.* A. T. Weston. (12) Sept. 23.
Preservative Coatings for Iron and Steel. (15) Sept. 23.
Imperial Works of the Oil Well Supply Co., Oil City, Pa.* (14) Sept. 24.
Replacing Girders in a Lower Story of a High Office Building.* (14) Sept. 24.
Concrete Pile Foundations at Washington Barracks, D. C.* John Stephen Sewell. (14) Sept. 24.
Modern Blast Furnace Construction: From the Drawing Office Point of View. I. G. Bayley. (20) Sept. 29.
The Shrinkage and Warping of Timber.* Harold Busbridge. (From *Technics.*) (19) Oct. 1.
A Novel Method of Plumbing a Chimney During Construction. F. M. Goodhue. (13) Oct. 6.
Concrete Pile Wall Foundations.* (14) Oct. 8.
Fire-Resisting Construction in the Butterick Building, New York.* (14) Oct. 8.
Resistance des Mortiers Hydrauliques à la Mer. Émile Camerman. (30) Aug.
Comparison des Pouvoirs Couvrants du Blanc de Zinc et de la Céruse. (33) Sept. 3.
Des Efflorescences Blanches et des Taches Rouges dans les Produits de Batiments. Alexandre Girard. (36) Sept. 25.

Topographical.

Monuments for Surveys. J. C. Herring. (60) Oct.
The Completion of the Longitude Girdle of the Globe: Determination of the Difference in Longitude Between San Francisco and Manila. Edwin Smith. (13) Oct. 6.

Water Supply.

Contract and Specifications for Furnishing Cast-Iron Water Pipes and Special Castings. (28) Sept.
The Puget Sound Power Company.* (12) Serial beginning Sept. 2.
Electricity from Water-Power. A. A. Campbell Swinton. (Paper read before the British Assoc. for the Advancement of Science.) (26) Sept. 2; (73) Sept. 2; (47) Sept. 10; Abstract (12) Sept. 2.
Nile Irrigation.* Hanbury Brown. (12) Sept. 9.
The Northern California Power Company's Systems.* (27) Serial beginning Sept. 10.
The Maintenance Organization on the Bay Counties Power Co.'s Works.* (14) Sept. 17.
Diagram Giving Discharge of Pipes by Kutter's Formula.* John H. Gregory. (14) Sept. 17.
The Wood-Stave Conduit of the Atlantic City Water-Works.* (14) Sept. 17.
The Irrigation Works of the Modesto and Turlock Districts, Cal.* (14) Serial beginning Sept. 17.
Government Drainage Investigations in Connection with Irrigation. (14) Sept. 17.
The Supervisory Control of Water Supplies in Great Britain. James Robert Kaye. (Paper read before the Sanitary Inst. of Great Britain.) (14) Sept. 17.
A So-Called Rusting Tank for Producing a Coagulant for Water Purification. (13) Sept. 22.
A Proposed Earth Dam with a Steel Core and a Reinforced Concrete Spillway at Ellsworth, Me.* J. A. Leonard. (13) Sept. 22.
Air Lift Pumps.* W. H. Booth. (26) Sept. 23.
The Three-Phase 40,000-Volt Power Transmission from Gromo to Nembro (Lombardia).* (26) Sept. 23.
Completing the New Croton Dam.* (46) Sept. 24.
The Open Sand Filters for the Providence Water-Works.* (14) Serial beginning Sept. 24.
Copper Sulphate Treatment of Lakes Clifton and Montebello, Baltimore Water-Works. Alfred M. Quick. (14) Sept. 24; (13) Sept. 29.
The Puyallup River Water Power Development near Tacoma, Washington.* (13) Sept. 29; (14) Oct. 1; (27) Serial beginning Oct. 1.
A New Sinking Pump.* (12) Sept. 30.
The Water Supply of Modern City Buildings. Wm. Paul Gerhard, Mem. Am. Soc. M. E. (10) Serial beginning Oct.
A Concrete-Steel Tower for a Water Tank. (14) Oct. 1.
The New Water Supply of Troy, N. Y.* William G. Raymond. (13) Oct. 6.

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Water Supply—(Continued).

The New Charles River Dam and Basin at Boston, Mass.* J. Albert Holmes. (13) Oct. 6.

Replacing the Earth Portion of the New Croton Dam by Masonry.* (13) Oct. 6.

The Works of the Ontario Power Company of Niagara Falls.* (14) Serial beginning Oct. 8.

Diagram Giving Dimensions of Conduits of Equal Capacity.* (14) Oct. 8.

L'Utilisation Rationelle des Boues des Eaux-Vannes et Industrielles.* M. Duyk. (30) Aug.

Pompe à Régulateurs Automatiques de Débit Système Daubron.* G. Carle. (33) Sept. 10.

Waterways.

The Peterborough Hydraulic Lift Locks on the Trent Canal, Ontario.* J. M. Bulkley. (67) Sept.

Sawing Off Piles below Water.* (14) Oct 8.

Les Établissements Maritimes de la Ville d'Anvers et Leurs Diverses Extensions.* G. Royers and Fr. de Winter. (30) Aug.

Note sur la Transformation du Canal de Roanne à Digoin.* M. Mazoyer. (35) Sept.

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* Illustrated.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 9.
NOVEMBER, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

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NEW YORK 1904.

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American Society of Civil Engineers.

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◆

The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

HOUSE OF THE SOCIETY—220 WEST FIFTY-SEVENTH STREET, NEW YORK.

TELEPHONE NUMBER, - - 533 Columbus.
CABLE ADDRESS, - - - - "Ceas, New York."

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AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

November 2d, 1904.—The meeting was called to order at 8.45 P. M., Joseph Mayer, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 145 members and 44 guests.

The minutes of the Thirty-Sixth Annual Convention, held in St. Louis, Mo., October 3d to 8th, 1904, and of the Society meeting of October 19th, were approved as printed in the *Proceedings* for October, 1904.

James C. Meem, Assoc. M. Am. Soc. C. E., was expected to address the Society and give a description of "A New Method of Tunneling as Applied to the Construction of the 14 and 15-foot Bay Ridge Sewer," illustrating his remarks with lantern slides, but, unfortunately, he was unable to be present, and the Secretary presented Mr. Meem's description. The subject was discussed by Messrs. Henry R. Asserson and Francis Collingwood.

The Secretary made the following announcements:

The transfer of the following candidates, by the Board of Direction, on November 1st, 1904:

FROM ASSOCIATE MEMBER TO MEMBER.

WILLIAM J. CARTER, Cleveland, Ohio.
EDWIN JOHN FORT, Brooklyn, N. Y.
JOHN HUNTER HANNA, Washington, D. C.
JOSEPH FREDERICK HASSKARL, Philadelphia, Pa.
LEWIS JEROME JOHNSON, Cambridge, Mass.
PAUL ALBERT SEUROT, New York City.
GRATZ BROWN STRICKLER, Baltimore, Md.
AARON HOWELL VAN CLEVE, Niagara Falls, N. Y.
CHARLES PAGE WILLIAMS, Cody, Wyo.
SILAS H. WOODARD, New York City.

FROM ASSOCIATE TO ASSOCIATE MEMBER.

JOHN PARRY JOHNSTON, Chicago, Ill.
HERBERT SEDGWICK WILGUS, Brooklyn, N. Y.

The election of the following candidates, by the Board of Direction, on November 1st, 1904:

AS JUNIORS.

ROBERT LEE ALEXANDER, Mound, Ark.
JULES ROWLEY BREUCHAUD, Croton-on-Hudson, N. Y.
JACOB HERBST BRILLHART, Port Griffith, Pa.
ALFRED THOMAS BROWN, New York City.
THEODORE DELONG COFFIN, Jamaica, N. Y.
DEAN GRAY EDWARDS, New York City.
ROBERT FOLLANSBEE, Malta, Mont.
HERBERT MILLER HALE, New York City.
EUGENE NATHAN HUNTING, Pittsburg, Pa.
ROBERT FAULKNER MOSS, Columbia, Mo.
JOHN PRINCE HAZEN PERRY, Jamaica, N. Y.
WILLIAM HALE PHILLIPS, Berkeley, Cal.
CHARLES SCHULTZ, Hannibal, Mo.
WALTER JAMES SPALDING, Lone Dell, Mo.

David Arnold Starbuck, Troy, N. Y.
Earle Talbot, Coyote, Cal.
Engel Bert Van de Greyn, Chicago, Ill.
Henry Christopher Westover, St. Joseph, Mo.

The Secretary announced that the Annual Convention of 1905 will be held at Cleveland, Ohio, during the last full week in June.

Adjourned.

November 16, 1904.—The meeting was called to order at 8.30 P. M., Vice-President Deyo in the chair; Chas. Warren Hunt, Secretary, and present, also, 135 members and 23 guests.

Mr. Walter C. Parmley, M. Am. Soc. C. E., addressed the Society and gave a description of "The Walworth Sewer, Cleveland, Ohio," illustrating his remarks with lantern slides. The Secretary announced the death of Louis Frederic Gustave Bouscaren—Vice-President, Am. Soc. C. E.; Director, 1881; elected Member April 7th, 1875; died November 6th, 1904.

OF THE BOARD OF DIRECTION.

(Abstract.)

October 6th, 1904.—President Hermany in the Chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Croes, Gowen, McDonald, Modjeski, Moore, Noble and Pegram.

The Secretary presented the following report received from the Secretary of the Nominating Committee:

"St. Louis, Mo., October 15th, 1904.

"Mr. Chas. Warren Hunt,
Secretary, Am. Soc. C. E.

"Dear Sir:

"A meeting of the Nominating Committee of the American Society of Civil Engineers was held yesterday evening, October 4th, at the 'Inside Inn.' There were present:

"Past-Presidents:
J. James R. Croes,
Robert Moore,
Alfred Noble,

"District No. 1—George W. Tillson,
" " 1—Albert Carr,
" " 2—J. P. Snow
" " 2—Fred. Brooks,
" " 3—Edward A. Bond,
" " 4—Richard Khuen,
" " 5—L. E. Chapin,
" " 6—John B. Atkinson.

"Meeting organized with Fred. Brooks, Chairman; Albert Carr, Secretary.

"The following nominations were made:

President, C. C. Schneider.
Vice Presidents, M. S. Holman, Emil Kuichling.
Treasurer, Joseph M. Knap.
Directors, District No. 1—Morris R. Sherrerd,
" " 1—A. L. Bowman,
" " 2—Hezekiah Bissell,
" " 3—Edwin A. Fisher,
" " 3—William B. Landreth,
" " 5—George S. Pierson.

"Respectfully,
"Albert Carr,
"Secretary of Nominating Committee."

Adjourned.

November 1st, 1904.—8.40 P. M.—Vice-President Curtis in the chair; Chas. Warren Hunt, Secretary, and present, also, Messrs. Buck, Craven, Croes, Deyo, Ellis, Gowen, Jackson, N. P. Lewis, Noble, Osgood, Pegram and Webster.

The following resolutions were passed:

Resolved, That no further subscriptions for membership in the International Engineering Congress be received after this date, unless remittances for that purpose have been mailed prior to October 31st, 1904.

Resolved, That the charge for the publications of the International Engineering Congress, to those who are not members of the Congress or of the American Society of Civil Engineers, be made $5 for each volume of the Congress publications, and that all who become members of the Society prior to January 1st, 1904, shall receive the *Proceedings* of the Congress free of charge.

A communication from H. S. Haines, Chairman of the Committee in Charge of the International Engineering Congress, was received and ordered printed in the *Proceedings.**

It was resolved that the next Convention of the Society be held in Cleveland, Ohio, during the last full week in June, 1905.

Applications were considered and other routine business transacted.

Ten Associate Members were transferred to the grade of Member, two Associates were transferred to the grade of Associate Member, and eighteen candidates for Junior were elected.

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*See page 455.

VISIT OF MEMBERS OF THE INSTITUTION OF CIVIL ENGINEERS.

The invitation of the American Society of Civil Engineers to the Institution of Civil Engineers to visit America during 1904, was accepted in December, 1902, and on September 3d, 1904, Sir William White, K. C. B., President of the Institution, and a party of 74 Members, Associate Members, Associates, and Students of that Institution, accompanied by 30 ladies and other guests, a total of 104, sailed from Liverpool and arrived in New York late on Saturday, September 10th.

On Monday, September 12th, nearly all members of the party registered at the Society House.

On **Tuesday, September 13th,** the visitors were received officially by the President at the Society House, and, after luncheon had been served, the party entered the new subway at the 60th Street Station, where, by courtesy of the Interborough Rapid Transit Company, a special train had been provided for the trip to the Park Row Station. The City Hall was visited, and Hon. Geo. B. McClellan, Mayor of New York City, said a few words of welcome. The party then returned to the subway and continued an inspection trip of this new work which was not then open to the public. On the same morning the ladies of the British party, accompanied by some American ladies, took an automobile drive through Central Park and the upper part of Manhattan, and were entertained at luncheon at Claremont on the Hudson, returning, *via* the Riverside Drive, to their hotels.

On **Wednesday, September 14th,** there was an all-day excursion to the Croton Dam now in process of construction. Transportation for the party was furnished by the courtesy of the New York Central and Hudson River Railroad Company, and luncheon was served at the Dam by invitation of the contractors, Messrs. Coleman, Breuchaud and Coleman. This excursion occupied the entire day.

Those who did not go on the above excursion made the trip around Manhattan Island in the steamer *Nassau*, which was furnished for the occasion by the courtesy of the Long Island Railroad. This excursion took place in the afternoon.

Both of these excursions were largely attended, not only by our visitors, but by members of the Society and their ladies.

Thursday, September 15th, was devoted to an all-day excursion to West Point. The party left New York, *via* the Hudson River Day Line boat, transportation for the visitors having been tendered by the Company, and arrived at West Point about 12 o'clock. Carriages were taken to the Cullom Memorial where the entire party was received by

Visit of- The Institution of Civil Engineers—as guests
of- The American Society of Civil Engineers—at
The United States Military Academy at West Point,
September 15th, 1904.

General Albert L. Mills, U. S. A., Commandant, and Mrs. Mills, and, after luncheon had been served, and the various buildings inspected, the Corps of Cadets paraded in honor of the party, and were reviewed by General Mills accompanied by the officers of the societies present. The return to New York was made by special train over the West Shore Railroad. A photograph of the party, taken on the steps of the Cullom Memorial after luncheon, is reproduced herewith.

Friday, September 16th, was devoted to various visits to points of engineering interest. One party visited the Filtration Plant at Little Falls, N. J., another the Brooklyn Navy Yard, and in the afternoon parties were made up, and visited, under guidance of the engineers in charge, the following points of interest: The Interborough Power Houses, Pennsylvania Railroad Shafts, Hudson River Tunnel, East River Bridges, and the New York Central and Hudson River Railroad Terminal Work.

On the evening of this day a banquet in honor of the members of the visiting party was given at Delmonico's at 7.30 P. M. The total attendance at this banquet was 260, and the speeches made on that occasion are printed in the following pages.

The party left New York for Montreal, Canada, at 7.30 A. M., on Monday, September 19th, by special train, kindly furnished to the American Society of Civil Engineers for the use of its guests, by the New York Central and Hudson River Railroad.

The Society is also indebted to the Grand Trunk Railway and to the Wabash Railroad for the courtesy of a special train from Toronto to Chicago, and from Chicago to St. Louis, respectively.

SPEECHES AT THE BANQUET

Given to the Visiting Members
of the
INSTITUTION OF CIVIL ENGINEERS
by
THE AMERICAN SOCIETY OF CIVIL ENGINEERS,
Delmonico's, New York.
September Sixteenth, 1904.

COMMITTEE ON BANQUET.

Charles Warren Hunt, *Chairman;*
Chas. W. Buchholz,
George H. Pegram,
Allen Hazen,
Wm. L. Saunders.

WELCOME.

Charles Hermany, President, Am. Soc. C. E.

Gentlemen, Members of the Institution of Civil Engineers, Englishmen and Canadians, Civil Engineers of whatever country or nationality, in the name and in behalf of the American Society of Civil Engineers, I greet you. I welcome you. I extend to you our friendship and hospitality.

We feel honored beyond description by the attestation of this magnificent assemblage of professional men—members of a profession that has scarcely a standing of one hundred years, and that ranks to-day as one of the first.

You, gentlemen, make epochs in history and fill the intervening eras with blessings for mankind. You are the vanguards and pioneers who subdue Nature and promote civilization as no organized body of men ever did in the history of the world. We feel honored in being your hosts, in entertaining you, and in giving you the right hand of friendship in a calling that to-day, in all the civilized world, ranks among the highest. We hope that upon this occasion you feel yourselves in touch with our country's enterprises, our institutions, our ambitions and our destinies, as expressed by the American profession of civil engineering. (Applause.)

We do not say this boastfully, but we say it confidently, feeling assured that in assuming this position we do not go beyond our depth. We will make the port that is destined for this noble voyage that we are engaged in.

Much has been done by us as civil engineers; more remains still to be done. Any man who has the privilege of gazing into the countenances of this assemblage and there perceiving the brain power it exemplifies, the physique it exhibits, and the courage that it has heretofore and will hereafter display, cannot doubt that our destiny is grand, that our objects will be accomplished, namely, making men individually and collectively better and greater.

Those of us who have been engaged for a lifetime in this vocation become daily more imbued with the nobility of its character, with the magnificent ends that it has accomplished, and still has in view. As a factor in the agencies of civilization, you will permit me to say it in modesty, the civil engineer ranks second to none. (Applause.) If there ever assembled a body of men as numerous as this in which there was present a greater proportion of strong men, of intelligent men, of cultivated men, of self-reliant men, of men who know what they are capable of and willing to do, it has not been my privilege to be present.

I feel proud and honored to have the opportunity to attest this fact, and, when I say it to you, I do not say it in any vainglorious spirit, but because I am impressed with the absolute truth thereof. No man can question the fact who has the privilege to look into your countenances and to address your intelligence.

We feel honored in the visit paid us by our guests from abroad in the sympathetic and enlightened spirit in which they view and inspect all our public works. I think it is impossible to manifest a deeper and a more lively interest in the enterprises of our own or any other country than that which it has been my privilege to witness on the part of these, our honored guests, in the few days which it has been my privilege to have intercourse with them. (Applause.)

Gentlemen, I thank you for the very kind attention you have given me, and submit to you the first toast, "The Institution of Civil Engineers," which will be responded to by the most distinguished naval constructor of modern times, or perhaps any times. (Applause.) In the magnitude of the work accomplished, in the responsibilities assumed, and in the stewardship rendered, he has no rival in past nor present history. (Applause.) I have the honor and pleasure to introduce to you Sir William H. White, President of the Institution of Civil Engineers of Great Britain, who will respond to the toast. (Applause and cheers.)

THE INSTITUTION OF CIVIL ENGINEERS.

Sir William H. White, K.C.B., F.R.S., President, Inst. C. E.

Mr. President, Ladies and Gentlemen: I beg you to believe that there has never been an occasion in my life when I have felt it so great an honor to be called upon to respond to the toast which has been given—that of the Institution of Civil Engineers. The occasion is so unique, the assemblage so extraordinary, that one cannot but feel moved deeply by such kind reference and such sympathetic reception as has marked this evening. (Applause.)

Gentlemen, it has been my lot, in a life that is now advancing, although not so advanced as some of my American friends have taken it to be (Laughter) it has been my lot to be president of more engineering societies than probably any man alive. Why this should have been added to duties that were onerous in themselves, I cannot tell, but I wish, sir, if I may in passing venture to correct one statement which you made, and to claim that it is more than a century—a good deal more than a century—since there were great civil engineers. I am a past-president of a society of civil engineers founded five years before this great Republic. The Smeatonian Society of Civil Engineers still exists. I cannot say that we do much professional work, but I can assure you, as an experienced member of that institution, that we have excellent dinners (Laughter); that we have choice gatherings of kindred spirits, and that in these gatherings on many occasions we have the pleasure of receiving American engineers. And that society bears the name Smeatonian, and Smeaton was a great engineer nearly one hundred and fifty years ago, so that we go further back, and we claim more than you, Mr. President, claim for us—for you, with us, share in that past; we have a common past in engineering as well as in other branches of our history as a people, for we are not going to let you off your share of the responsibilities in all that went before that breach which happened now nearly one hundred and thirty years ago (Applause and laughter), which has seemed at times to be enlarging, but which, as a matter of fact, as the century goes on, is ever closing. You are making bridges across your rivers, and tunnels underneath to increase communication between the different parts of this great city. You on your side, we on ours, are throwing out bonds of union. The breach is closing. Cannot we say it is closed? (Great applause.)

We are one people in the past, with a common knowledge, with common aptitudes; as I said the other day in your house, common faith, common hopes, common principles; shall we not say, while holding our own and developing on our own lines, you in your great Republic and we in our great Empire, that we shall have in all essentials a common future? (Great applause.)

There hang the two flags, gentlemen, side by side. I trust the time will never come—I believe the time will never come—I am sure the time should never come (Cries of "Hear, hear," and applause)—when they won't float over the forces of two great friendly peoples, between whom there may be no formal bond of alliance, but who are bound together by ties stronger than any diplomatic documents, for one purpose (Applause), and that purpose to promote the opportunities of the world, to increase the happiness of mankind, to nourish commerce, to establish intercourse, to make the whole world better.

There is no cant in such a wish as that. (Applause.) Gentlemen, what do we want, the two great countries? We have no lust of conquest; we have no desire but the peaceful prosecution of trade and the benefit of our fellowmen, while doing a little business for ourselves. (Applause and laughter.)

We engineers deserve all that the President has said of us. Perhaps he was too modest; I think he was. Gentlemen, do you know what the word "engineer" means? I think sometimes even we engineers forget; I think even amongst engineers there is sometimes a fearful thought that it has something to do with machinery at the bottom, after all (Laughter), but although I am a past-president of the Mechanical Engineers, I scorn that idea. (Laughter.)

No, no, the true meaning is what our former Honorary Secretary of the Institution of Civil Engineers, Dr. Colgate, gave to it. It goes back to the old French verb, to devote oneself, to get at the bottom of things, to do things. That is our mission here. To quote from our old charter, it is our business to bring the forces of Nature into the service of Mankind. That is what we are always doing in many different ways, but that is our mission, and can anything be nobler? Can anything be nobler than to further the comfort and all that makes for the happiness of our fellowmen? Can anything be better than to make peoples know one another, to facilitate intercourse, to promote interchange, and so to make the whole world one —and that is the mission of the engineer.

And one need not go so far afield as that, for here in this great city it seems to me the lesson stares one in the face on every side. This city, in its situation and its surroundings, has natural advantages which, in some respects, are unsurpassed, but what would they all have been without the labors of the engineer? What use could be made of them if there had not been men who were able to deal with the situation and to turn it to practical account?

And now, as by your favor, we, your visitors, your guests, have been taken from day to day from one place to another in this marvelous region, this region of enlightenment from the engineer's point of view, we find on every side not merely monuments of past work, but we find great works in progress—progress which is so rapid as to be almost startling. We find bridges, tunnels, all kinds of transit, including that great work which we had the happiness of visiting three days ago (time passes so quickly that one almost forgets), and I hope, gentlemen, that when the Rapid Transit Subway, which is now so near opening, is opened, it will always be remembered that we of the Civil Engineers from Great Britain were amongst the first to be taken over its lines, and perhaps of all the millions who in the future will be carried, there will be none who will be more stricken with admiration, and I doubt if there will be many more competent to appreciate the magnitude of that great scheme. (Cries of "Hear, hear," and applause.)

And then one cannot forget these towering structures that lift their heads to heaven because the earth below is so precious. (Laughter.) Well, now, where would they be without the civil engineer? When one sees them in their finished form, in what may be called an architectural disguise (Laughter), one criticises the taste and ability of the architect, but beyond that lies a skeleton. (Laughter.) I do not know what the future of New York will be, but we have got a proverb about skeletons in the cupboard, but here the skeleton is far, far more extensive than can be put into any cupboard, in fact, it makes the thing itself. It is only another proof, Mr. President, of your general proposition that the most modest men on earth are the civil engineers (Laughter and applause), and that almost leads me to say that I must sit down at once, but there is one thing more I want to say.

Professors of pure science are now busy with one more speculation upon the constitution of matter. It is a great thing to be optimistic; it is a splendid thing to believe that what you are saying at the time is the last word on the subject, because it gives you confidence and force. It is quite true that you may have to amend it next year, but meantime be confident, at least be confident; and so we are told that now there is good evidence that electricity—whatever that may be—is the substance upon which all matter is based, of which all matter consists. Well, we have had the ether with us for many years; it is a convenient term; it enables us to imagine—to exercise the scientific imagination—and so to frame theories by which certain phenomena may be reconciled or explained, and so I have no quarrel with my brothers in the scientific world because, gentlemen, I for one venture to say that the engineer is as truly a man of science as the man who devotes his efforts to pure research. We are brothers in science, and when any one is disposed to tell me that the man who turns his scientific knowledge to practical account falls into some inferior position, I say, nonsense, nonsense. (Applause.)

There is no other way of dealing with the subject, nor is there any force in the contention that there is something mean and sordid in one's getting his livelihood by doing honest work, even as an engineer (Laughter); but coming from these speculations, we on our side have quite as high a respect for electricity as the purely scientific theorists, only to us electricity is a servant to be yoked and moulded and adapted to the needs of the universe and of mankind, and here in this great city one seems to live in an electric atmosphere; the hum of the dynamo is over it all (Laughter), and my first nights here were troubled by strange and unusual noises, and my windows were lit up by fitful flashes, and I have come to the conclusion that one reason why we Englishmen have enjoyed this visit so much is that we have been in a magnetic field all the time. (Applause and laughter.)

At all events, this I am sure of, that the magnetism of your kindness and the courtesy of your reception, your constant care for our comfort, the generous hospitality which we have received on all sides, must tend to bring about closer union between engineers here and at what we can all call "home," for though the President alluded to visitors from abroad, I claim that we are visitors from home—home. (Great applause.) And when you come there, you will come home. (Applause.)

It is true it is the old home; you have your own homes. That is all right. We have our children; they make their homes; but, gentlemen, they always say, they will go "home" so long as the father and the mother can be found, and, gentlemen, they often go home even when the father and mother are no longer there.

I heard a story in New York—and that is the last word I will say—it was only a few days ago I was talking with a workingwoman here, and she said to me, "You are an Englishman." "Yes," I said, "I am." She said, "My father was an Englishman; he came here and brought me when I was only six months old, and he is now an old man and he is at home in England." I said, "He has gone to England?" "Yes," she said, "He told us that he could not die happy until he had gone to see his home again. He was only a workingman, and his children said to him, 'Isn't it too arduous a journey, too long a journey, too difficult a journey for an old man like you?' He said, 'No, I must go home.'" (Applause.)

Gentlemen, that word is English, peculiarly English. There is no other language that has that word, and that is common to us all. (Great applause and cheers.)

The President.—Gentlemen, the next toast is "The Louisiana Purchase Exposition." It will be responded to by a past-president of of the American Society of Civil Engineers, whose home is in St. Louis, whose connection and identification with all of her most important enterprises, municipal and commercial, has been so close as to qualify him in an eminent degree to respond to this toast. I have now the honor to introduce to you Mr. Robert Moore. (Applause.)

THE LOUISIANA PURCHASE EXPOSITION.

Robert Moore, Past-President, Am. Soc. C. E.

Mr. President and Gentlemen of the Society of Civil Engineers, you, Mr. President, and Gentlemen, Members of the Institution of Civil Engineers, in addition to the reasons which have been given to you by our President or which will be given to you by those who follow me for welcoming you to our shores, we who live beyond the Mississippi have reasons that are peculiarly our own. For we, in that region, are this year celebrating our first great territorial holiday, in commemoration of the Centennial Anniversary of that most auspicious year in which the flag of Spain and the flag of France were lowered, and the flag of the English-bred and English-speaking people of the United States of America was hoisted in their place. (Applause.)

The territory which was thus added to our national domain was the whole western water-shed of the Mississippi River, a territory which, in extent, is more than equal to the area of Great Britain, Germany, France, Italy, Spain and Portugal combined.

To this great territory, therefore, gentlemen, we bid you a most hearty welcome, and we trust that you may traverse it from end to end, that you may see what marvelous results United States American English-speaking energy and enterprise have wrought for us. For, in those years, the wigwam of the savage has been replaced by the home of the white man ; the prairies have been dotted over with school houses ; in the wilderness great cities have sprung up as by magic, and the whole area has been covered with a network of railways whereby widely separated States have been bound together into one people—a people as alert, as resourceful, as self-reliant—and, may I say it, as open-minded and as open-hearted as any people upon whom the sun has ever shone. (Applause.) And, not content with this, our hardy pioneers have crossed the crest of the water-shed of the Mississippi River by which we were bounded, and have pressed on westward to the last limits of the land, and now we, their successors, through an American cable, touching on its way only on American soil, send greeting to our English brethren across the ocean at Hong Kong. (Applause.)

Whatever may be said of the motive of Napoleon in making this transfer—and I think little that is good can be said of him—there is little doubt that of all the acts of his life this was the one which has contributed most to the welfare of mankind. It removed peaceably a barrier in the development of a fresh and vigorous people; it placed the tools of civilization in the hands of those who have known well how to use them.

As a means of commemorating and celebrating this great event in our history and in the world's history, it has seemed to us that there was no more fitting precedent that we could follow than one which has been set for us by you in the mother country in the first great international exhibition of 1851. The government and the people of the United States, therefore, have joined with the chief city of the Louisiana Purchase, and the chief city of the Mississippi Valley, in inviting the nations of the world to join with us in an international exhibition in which each nation should bring that which will best illustrate the progress which it has made in the arts of civilization; and to this call the response has been so general and so cordial as to exceed our most sanguine expectations, and the result has been an exhibition which is certainly unequalled in extent and unsurpassed in quality.

In some respects, indeed, it is quite unique. Never before have the nations of the Orient, China, Japan and our own new possession, the Philippines, been so fully represented; never have there been gathered together so many examples of the early types of mankind. One may therefore see, not only the civilization of the present day represented in its works, but he may also see in living examples the steps by which, through centuries and millenniums of the past, this civilization has been attained.

Of the value of such an exhibition, as an educational influence, as a means of better understanding between nations, and as a means of stimulating them to greater efforts on the part of each in the future, too much cannot be said. But to no class of men does such an exhibition have greater interest than to the engineers, using the word "engineering" in the broad sense of the words of Tredgold to which you have alluded and which has been adopted as a part of the charter of the Institution which you represent, that is, as the "Art of directing the great sources of Power in Nature for the use and convenience of Man." In this sense I say that this exhibition and all such exhibitions are largely an exhibit of the work of the engineer. Everywhere may be seen the work of Watt, and Smeaton, and Telford, and Stevenson, and their thousands of successors. In fact, were it not for the steam engine, for the railway and for the thousand tools and trades which these elementary devices and inventions have made possible, the very formation of such an exhibit would have been an impossibility, if, indeed, it had not been beyond the possibility of man to conceive.

To this great territory, then, the acquisition of which by the United States marks one of the great steps of the English-speaking people in the leadership of mankind, and to this great exhibition which registers the progress which man has made to-day at the opening of the Twentieth Century in subduing the forces of Nature to the service of Man, we bid you a most hearty welcome, and may your visit add as much to your pleasure and your profit as it will add to our pride and to the prestige of our holiday. (Great applause.)

The President.—Gentlemen, the next toast in order is "The International Engineering Congress," which will be responded to by a member of our Society to whom, in his enthusiasm in the profession of engineering, I cannot do reasonable justice. I will permit you to judge, yourselves, when he dilates to you upon this subject. I have the honor now to introduce to you Mr. Henry S. Haines. (Applause.)

THE INTERNATIONAL ENGINEERING CONGRESS.

Henry S. Haines, M. Am. Soc. C. E.

Mr. President and Gentlemen, in which expression I have the honor of including the ladies, you have all listened with interest to the remarks made by our honored Past-President with reference to the Louisiana Purchase Exposition. Now, may I be permitted to divert the current of your thoughts for a few moments to a side-show of that exposition. (Laughter.) In the words of the immortal Artemus Ward, who said that his show was a moral show, I want to say that this show about which I am to speak to you also has a moral, and before I get through with what I have to say I hope that you will see what the moral of it is.

Those of us who have not yet had the opportunity to visit the St. Louis Exposition may take it for granted that there are exceedingly interesting exhibits of the material resources, the industrial products and the works of art of many other countries, but that the only real, adequate and representative display will be from our own land, and it will be that part of the exposition which will be of most interest to our friends from abroad. (Applause.)

Now, as we Americans, or I will put it a little more modestly, as we United Staters pass along in review of these miles of our exhibits and our hearts swell with pride at the impression which we know that those exhibits will make upon the minds of these visitors as to our greatness and our power, is it not worth our while to look back to the origin of all this greatness, and to consider how much of it is due to ourselves and how much to a benign Providence.

We have inherited a splendid patrimony, it is true, but have we made the best use of it? Those who have never been abroad may think that we have; those of us who have had the opportunity to see what the rest of the world is doing may be rather doubtful of it.

It is this question which comes home with peculiar force to every member of the engineering profession in this country, for this wonderful display of exhibits would be meaningless and without intelligible connection with its purposes unless it could be associated with some rational interpretation of the processes by which all these things were brought into existence.

In the growing complexity of industrial instrumentalities, there is scarcely one of these exhibits but which owes either its form or its function to some phase of engineering activity. It is this aspect of the St. Louis Exposition which makes it a most favorable opportunity for us to compare our own engineering processes with those which have been developed elsewhere under different conditions, and more deliberately. Have we made a better use of our national resources than others have? Have we applied them to the welfare of our people with greater efficiency and economy?

It is in response to this attitude of your own minds that you, the members of the engineering profession in this country, may derive the most profit from an examination of the display made at this St. Louis Exposition.

Gentlemen, with this in mind, the Board of Direction of the American Society of Civil Engineers has undertaken the organization of an International Engineering Congress in connection with this Exposition. In doing so, the Board recognizes the responsibilities which have attached to this society for over half a century in the legitimate exercise of its function as the representative organization of the engineering profession in general in this country. Its high standard of requirements, both personal and professional, attest to the character and the attainments of the thirty-two hundred of its members, and we may even claim for it that it is a sort of an International Association in itself, since nearly ten per cent. of its members reside abroad.

The American Society of Civil Engineers would, therefore, seem eminently fitted to undertake an organization of such a Congress as being the central source from which have radiated the several specimens that have won their way to prominence since its foundation, as factors in the ever-widening field for the application of the forces of Nature to the use of Mankind.

Keeping this purpose in view, the Committee on Organization has selected from this general field of engineering certain topics for discussion at this Congress as being of immediate and increasing importance, not only to the engineering profession, but to civilization as well, for civilization is advancing with such rapidity that its progress can no longer be followed step by step for a century, in an exposition of its achievement; only for a decade at most, and any effort to set forth its processes cannot be successful that undertakes to do more. The Committee, therefore, hopes that the proceedings of this Congress may set forth the progress that has been made in the past ten years, in the improvement of processes and appliances in the several branches of engineering, rather than to be devoted to historic and biographical reminiscences and to the description of monumental work, and that the deliberations of this Congress may be the means of enlightenment to the members of this Society, to whose liberality we are indebted for the means to bring this Congress about.

In accordance with these views, the Committee has endeavored to prepare a suitable basis for the succinct discussion of these several topics which have been selected, by procuring from engineers of recognized eminence in their respective countries leading papers for this very purpose, to confine, as far as possible, the discussion to this particular phase of engineering progress, and from the opportunities afforded me to form an opinion, I believe that from the responses which have been made to the requests of the Committee, that the proceedings of the Congress—in which will be, of course, included the discussions at the sessions—will be of interest and of value as an exhibit of the most recent practice in the several branches of engineering, not only here, but also abroad.

The syllabus of subjects includes topics relating to military and naval engineering, in which the chiefs of the department bureaus at Washington have most kindly taken an interest. In our country the military engineers have the improvement of harbors and waterways directly under their charge, and you will see from their contribution to the transactions of the Congress that their ability and experience is of as much value to their country in the development of its resources as in the defense of its frontiers. (Applause.)

There is another feature of this Congress which it is greatly desirable to have properly emphasized, and that is the topic of engineering education. No one should undervalue the lessons of empirical experience, of knowing how to do things for themselves, the very basis of engineering as an art; but as the field of engineering broadens from the structural use of materials to include the application of natural forces, as engineering approaches the condition of applied science, it becomes of as much importance to know what can be done as to know how to do it, and this is the service which the engineer, in the study and the laboratory, renders to the engineer in the field.

Now, as the Committee has set apart a section for the discussion of what may be termed engineering pedagogy, it is to be hoped that that section may be made of conspicuous value by the concurrent aid of all professors of technology, and of those engineers from abroad who are here to-night I ask on behalf of the Committee that they will take an active interest in the sessions of the Congress, for, gentlemen, whatever may be the differences of opinion among us here at home as to the discouragement of the importation of foreign commodities, I believe that none of us desire a prohibitive tariff on international exchange of ideas. (Applause.)

Now that I am addressing my remarks to our friends who have been with us for this past week, I would like to conclude what I have to say by something that I have been reminded of in the very eloquent remarks of the distinguished gentleman who represents our foreign visitors here, or, I ought to say, our brothers from the old home, (Applause) by relating the experience of a friend of mine, which I do not mind telling you before my American brethren.

Well, my friend was at Saratoga Springs, which is one of our noted national watering places, and he was taking a drive around the environment, and his driver who was telling him about all the things there were to be seen, about all the fine residences and the beautiful grounds and the views on the lakes, and what great sport they were having at the races and all this kind of thing, and it occurred to my friend to ask him to drive him to the battlefield of Saratoga. Well, the man pondered for a moment, and he said, "The battle of Saratoga?" "Why," he says, "I never heard of any such battle." (Laughter.) "Oh, yes," my friend said, "Oh, yes, it was a great battle where we fought the British." "Well," the man says, "may be so, it might have been such a battle, but I never heard of it, but if there ever was such a battle I reckon it is obsolete now." (Applause and laughter.)

Now, gentlemen, I must quote Artemus Ward to you, "The force of this remark lies in the application thereof." (Great applause.)

THE PRESIDENT.—Gentlemen, the next toast in order is "The City of New York." This was to have been responded to by the Hon. George B. McClellan, who, by official duties, is prevented from being present, and therefore you may assume that this great metropolis extends to you the heartiest welcome and its unlimited hospitality; bids you Godspeed in your work, and encourages you in all your enterprises, whether National, State, or International.

We will therefore pass the toast, and proceed to the next, which is "The Civilization Engineer," a subject upon which you will be addressed by a man who has made this subject one of exhaustive study and is prepared to give you some of its most recent and encouraging directions. I have the honor to introduce to you Mr. James P. Munroe. (Applause.)

THE CIVILIZATION ENGINEER.

JAMES P. MUNROE, ESQ.

Mr. President, my British fathers and my American brothers: I hasten to repudiate the idea that engineers need civilizing. The distinguished President of your British Institute, in his very charming address, told us rather complacently of the Smeatonian Institution which, he says, was old, gave fine dinners, and did nothing. I, too, coming from Boston, would like to brag a little. (Laughter.) We have in Boston an institution that is old, that gives fine dinners and does nothing. (Laughter) Need I say, for you Britishers are well acquainted with it, that I mean the Ancient and Honorable Artillery Association. (Great applause.) And speaking, as the last gentleman did, of obsolete battles, may I venture to say that I was born in Lexington, and my great grandfather lined the men who first defied you.

And in this connection they tell a good story of that most charming and beautiful old Englishman who is now a resident, and has been for many years a resident of America, the Rev. Robert Collier. Some years ago he took his little grandson, who is a fine American patriot, to Lexington to show him the battlefield there, and the Rev.

Robert Collier said to the boy, after explaining the details, "Well, Sonny, it was not much of a battle after all." "Well, Grandpa, anyway we licked you." (Laughter.)

I wish to thank you, Mr. President, and Gentlemen of the American Society, for the extraordinary privileges of being here this evening, and of joining in the expressions of pleasure at seeing here so many eminent engineers from the other side of the Atlantic, that Atlantic which by engineering skill has been reduced to the mere width of an ordinary pond, separating us, as Sir William White has said, from our old home. As an unprofessional man, I feel an exaltation at being in this high company; as a Bostonian I feel grateful that this huge metropolis is willing even to acknowledge that there is any other city in America (Laughter), and as a layman I rejoice in the opportunity of saying and trying to prove what I have long maintained, that you civil engineers are, in fact, civilization engineers; that you are not merely builders of roads and bridges and mills and machines, but that you are, in the supremest way, builders of a better material, intellectual and spiritual life. As an outsider, I may claim for you what you are rather ready to claim for yourselves, the first place among the forces which make for the material and moral advancement of mankind.

In your journeyings here, you have seen or will see, doubtless, many of our public monuments and statues, and with some notable exceptions, you will doubtless wonder, as we do when we look at them, why it is that individuals and communities are willing to spend such large sums of money in advertising publicly their ignorance of art. (Applause and laughter.) But with these notable exceptions, you will agree with us that the striking and important monuments here are not the work of the sculptor, but that those monuments of the railroads and the bridges, the subways and the towering skyscrapers, and by the way, speaking of those reaching heaven, we Bostonians believe that that is the only way in which New Yorkers ever will reach heaven. (Laughter and applause.) These monuments, we believe, and we think you will agree with us, are the great monuments of this country. Those statues of marble and of bronze are static; they represent past events which our later experience may have repudiated, but these monuments of the engineer are glorious, dynamic evidence of the splendid future that is to be.

Once upon a time, we Bostonians permitted a leaden statue of King George III; later we decided to melt it into bullets to fire at His Majesty's troops.

Not many years ago, in this City of New York, they erected a triumphal arch, which, I believe, is no longer standing. (Laughter.) In the Boston Athenæum there stands a row of marble busts unlabeled, for the reason that, although fifty years ago those men were great, to-day not one human being can identify them. (Laughter.)

But you engineers, on the other hand, are every day building your own monuments; every day, in laying the foundations of your structures, you are laying more solidly the foundations of human welfare; every day as you uplift those structures you are uplifting all mankind; every day as your workmen drive in the bolts, you engineers are bringing closer and closer together the whole human family. Every day, silently and steadily, you engineers are transforming the destructive agencies of the old military engineer into the constructive agencies of the civil—or, as I like to call him—the civilization engineer.

There is no doubt that you engineers are the supreme motive force of modern civilization, first, as I have said, because your work is dynamic and not static; secondly, because in everything that you do, more than anything any other man has to do, you have to be obedient to absolute and immutable laws; and thirdly, because in eagerly seeking out those laws and using them for the benefit of mankind you are freeing man, making him the master where he was formerly the slave of Nature (Applause), and to civilize a man is simply to make the animal side of him independent.

The hungry man can have no thought except of his insistent appetite; the isolated man can have no ideas beyond the narrow range of his horizon; the man bound down to grinding toil can never lift his mind and soul above his daily torture; but you engineers, by your work, are making the hungry man and the hungry nation to disappear; by your labors you are bringing the isolated man into commerce with all the world; by your inventions you are replacing the aching and strained muscles of the manual laborer by the tireless machine.

A pessimist is said to be a person who has to live in the house with an optimist. (Laughter.) If that be true, then my family must be sad pessimists, for I have abounding faith in humanity, and I see no immediate or future danger, as many do, in the tremendous power of wealth that the labors of you engineers have, in the last half century, created, for it is your work alone that in this last half century has created these colossal fortunes, these enormous combinations of business, this speculation and promotion on a perfectly incredible scale; but these evils appear gigantic as compared with similar evils of the last generation, simply because everything now, the whole scale is itself colossal.

There has been a tremendous advance of the whole social scheme, and, while that social advance has made rich men incredibly richer, it has also lifted up at the same time thousands and hundreds of thousands of men who, under old conditions, would have known nothing but hopelessness; it has lifted out of utter degradation thousands and tens of thousands of others who are now decent citizens because of the work of you engineers.

As I have said, I am not a professional man, but in connection with the Massachusetts Institute of Technology, which I am sorry you are not to visit as an organization, and which I hope you will visit as individuals before you go back—in connection with the Massachusetts Institute of Technology I have something to do with the training of young men, and it seems to me that the most important, as well as the most difficult, problem before all of these schools of applied science is to make the young graduate understand the tremendous power that he has in civilization, the colossal part that he is to play in the future of the world.

The average undergraduate fixes his mind upon professional details, upon what we may call the knacks and tricks of the trade. The duty of those schools should be to make those young men see that they are not to be simply engineers; that they are to be leaders in civilization. Therefore, the work of those schools is not simply to teach engineering; it is to compel those men to have a broad outlook upon life, a wide outlook upon men, a noble outlook upon the professions which they are to follow; and unless those schools and those colleges meet this, unless they train these young men in this broad way, then they will not be fit to be engineers, and they will not prove to be fit successors for such men as you. (Applause.)

The President.—Gentlemen, the next toast is "The Army." It will be responded to by a gentleman who hails from the State of Ohio, the Mother of some Presidents; bounded in part on the east by my native State, Pennsylvania, and partly on the west by my State of adoption, Kentucky. I have now the honor and pleasure to introduce to you Lieutenant-Colonel G. J. Fiebeger, of the United States Army.

THE ARMY.

Lt.-Col. G. J. Fiebeger, U. S. A., M. Am. Soc. C. E.

Mr. President, Ladies, and Members of the Institution of Civil Engineers of Great Britain, and Fellow-Members of the American Society of Civil Engineers.

The essence of warfare was aptly put by that old Confederate Cavalry raider, Gen. Foster, when he said, "I don't know much about your maneuvers or other fancy business, but I do know that the feller that gets thar first with the most men is mighty apt to win." (Laughter.)

That is the great problem which all great commanders have been trying to solve from the time of Alexander to Kuropatkin. (Cries of "Hear, hear" and applause.) And I am not certain but what the latter gentleman might add something about the necessity of staying there when you get there.

Now, it was in solving this "getting thar" problem that we of the the military profession believe we founded that great profession of engineering. We believe that it was the pioneers of the armies of Alexander, Hannibal and Cæsar who opened the roads for their advance through primeval forests, over marshes, through mountain gorges, who founded that great army of road-builders who are to-day connecting the oceans with their bonds of steel and making the maps of the continents look like wire entanglements with their intersecting railroads.

As I look over the names of those present and see the names of so many eminent members of that army of road-builders, I feel proud to belong to a profession that started you on your road to fame. (Laughter.) We also believe that it was the pioneers of those early armies that were the forerunners of the great army of bridge-builders which is to-day spanning the rivers of the whole world in the interests of commerce, just as their founders did in ancient times in the interests of war. Ever since reading in Cæsar's Commentaries the description of his bridge over the Rhine, I have had a tremendous admiration for the army of bridge-builders, and since I have had the personal acquaintance of some of the designers of those gigantic structures which now span the Niagara River, my admiration has greatly increased. I believe to-day we would be reading of projects for spanning the gap between Mars and Earth with wire or eye-bar cable (Laughter), with cantilever of steel or concrete structures with suitable architectural approaches (Laughter), were it not for the instability of the foundations and the uncertainty of the span.

I am, therefore, proud that we, of the military profession, are the sponsors for the bridge engineers. I might go further into the province of engineering, for my friend Herschell wrote as well upon the strategems of war as he did upon the waterworks of Rome, but I am afraid I would tire you, and therefore I would rather turn to the other side of the picture and show what the military profession owes to the engineers.

Modern warfare would be impossible were it not for the railroads constructed and operated by engineers. The first great commander to acknowledge that was General Sherman, who tells us in his Memoirs that his celebrated Atlantic campaign would have been absolutely impossible were it not for his admirable corps of road and bridge builders. He tells us that these gentlemen became so expert in the construction of roads, railroads and bridges, and even tunnels, that they could construct them much more rapidly than Forest and Joe Wheeler could destroy them. This was a fatal blow to those gentlemen, and also to the Confederacy.

It was due to the magnificent railways of Germany that Von Moltke, in 1870, was able to get to the frontier first with the most men, and conquer France.

In the latter part of the Nineteenth Century, when General Kitchener, the Sirdar of Egypt, decided to move (Applause) to overthrow the Mahdi at Khartoum, he remembered two comments of Napoleon. The first was that a great desert is a more formidable obstacle in front of an army than a great river or a great chain of mountains, and second, that he who proscribes the aid which the engineer's art gives to the commander in the field deprives himself of an auxiliary force and expedient always useful and sometimes absolutely necessary. The Sirdar, therefore, called to his aid the road and bridge builders who laid his tracks across the great Nubian Desert; he built his Atbara Bridge, with the assistance of the American Society of Civil Engineers, and he reached the field of hostilities, if not with the most men, at least with a few of the best, and a thin red line reconquered the Soudan. (Applause.)

These are but a few of the examples in which the fighter and the engineer have operated together in the field, but they are sufficient to show that scientific training is absolutely essential to the soldier, and that the commander of future armies, if not an engineer like McClellan, Gen. Lee and Gen. Kitchener, must at least have sufficient scientific training to appreciate, like Napoleon and Gen. Sherman, that the engineer's art in the field is always useful and sometimes essential.

The future of warfare is destined to see a great expansion of the engineer's art in the military field. Besides the road and bridge engineer, the mechanical engineer and the fortification engineer, the Army must call to its aid the electrical engineer for running the searchlights, to operate its submarine mines, and also to operate its great seacoast guns. It must call to its aid the mining engineer to run the tunnel approaches to fortified places, and thus avoid the shell which makes the advance over the surface to-day almost impossible. It must call to its aid the sanitary engineer to reduce the mortality in its great camps of concentration. The very term "scientific warfare" means warfare in which the engineering art is bound to take a prominent place. (Applause.)

The President.—Gentlemen, the next toast is "The Navy." This was to have been responded to by Francis T. Bowles, Esq. Inevitable absence devolves that important duty upon the constructor of the greatest battleship of modern times, the *Connecticut*. I have the honor to introduce to you Naval Constructor W. J. Baxter.

THE NAVY.

W. J. Baxter, Esq.

Mr. President, it is very regrettable that Admiral Bowles, the late chief constructor of our Navy, is absent; it is regrettable for your sake and for mine. Mr. Bowles knows all about our Navy, and he knows how to make a speech. I know something about the Navy, but I don't know how to make a speech. Sir William White knows about all of the navies and he knows how to make a speech. (Applause.)

The one thing that has struck me here this evening is the great modesty of all of the speakers. Now, the Navy certainly goes as far back as the time of Father Noah. He certainly was an admiral, and he may not have been the first naval constructor, but he was a naval constructor as well as an admiral. Therefore, I think that my profession is the oldest one represented here to-night. (Applause.)

The battleship of the day, gentlemen, is the combination, is the representation of the united engineering talent of the world. Every part of the engineering profession contributes to its development, its design, its building and its use.

Now, I have heard talks of engineers who were interested in tunnels. Well, you can go down in the shaft alley and you can get a very good example of a tunnel. If you are interested in bridges, why, any battleship that has not got to have four bridges is of no account at all. If you are interested in railroads, well, what are your railroads for? Simply to bring things to build battleships with. You are interested in harbors. What are they for? They are simply places in which the battleships can go. And so it goes.

Now, this electric galvanic spark, the battleship, is permeated with electricity all the way through, and Sir William White surely has forgotten some of his nights on board battleships when he thinks of his nights in New York.

There is one thing, gentlemen, that possibly some of you don't know, that to Sir William White, more than any man outside of this good country of ours, belongs the development of the new navy. The men who designed and built it in the first place were brought up under his tuition. (Applause.) Since our feathers have begun to spring, we have tried to do some designing on our own account, and we have been a little bit slow, so that where we bring out a battleship of 10 000 tons, Sir William would bring out another one of 11 000, and immediately we bring out a cruiser of 12 000 tons he would bring out one of thirteen, and so it went along.

Now we are building a class of ships, one of which I am connected with, the *Connecticut*, of 16 000 tons, which we consider the very finest battleship in the world, and when the *Connecticut* is put afloat to follow her sister ship, the *Louisiana*, which was put over two weeks ago, those ships are to-day the most powerful battleships afloat, but I won't say anything about Sir William, but somebody over there has got something on paper which is a little bit larger than the *Connecticut*. (Laughter.) Now, we won't stand for it, and we will beat her next time.

There is only one other thing. It has been said that the civil engineer is the civilization engineer, but the most powerful civilization engineering element in the world is the Navy, and the country which has the Navy is the one which controls civilization. (Applause.)

The President.—Gentlemen, the next toast is "The School," which will be responded to by a Member of the American Society of Civil Engineers, the President of the Stevens Institute of Technology. I have the honor to introduce to you Alexander C. Humphreys.

THE SCHOOL.

Alexander C. Humphreys, M. Am. Soc. C. E., President of Stevens Institute of Technology.

Mr. President and Fellow-members of the Institution and the Society.

"The School," and, before this audience, that must mean the School of Engineering, is a large subject to cover in my allotted time of ten minutes.

Certainly, then, I cannot discuss details of curriculum and methods of instruction, nor do I suppose these matters would be of interest except in a few individual cases.

But there are certain broad questions of Engineering Education and the connection between the School and Practice to which I will ask your attention.

Permit me to say that I shall speak from the experience of thirty years' practice as an engineer, followed by two very strenuous years devoted both to practice and technical education; and from the experience gained from supervising the post-graduate training of the members of my several Cadet-Engineer Corps. And let me add for the benefit of our visitors, that these young graduates of Engineering Colleges, while thus obtaining post-graduate training, earned, or anyway were paid, at least $50 per month, or say £120 per year.

And this brings me to my first point: The work of the Engineering Schools, even the best of them, is often misjudged through the ignorance of employers who expect their cadet-engineers at once to show practical proficiency in any and every branch of Engineering.

The partial exercise of a limited intelligence should promptly make it plain that the best four years' engineering course can only prepare the students to equip themselves promptly and surely to be efficient workers in any one engineering or industrial specialty.

Graduates and employers alike should appreciate that a graduate degree in engineering, while undoubtedly well earned as compared with other graduate degrees, does not indicate that the holder is qualified for immediate successful practice in Commercial Engineering.

The man is yet to be proved as well as the education. And even if the individual's manhood proves sufficient, there is much yet to be learned in the School of Experience.

Nothing can take the place of experience-learning, whether in Engineering or any other line of human endeavor. Certain rare personalities have been able to learn so much in the School of Experience without the advantages of previous technical education, that some who take the exception as the rule have made comparisons unfavorable to the so-called theoretical engineer and favorable to the so-called practical engineer.

But it is no longer a question between these two systems of education, for if we except geniuses, the man who to-day wishes to gain real success as an engineer must avail himself fully of both systems.

I appreciate this is all trite, but because these truths are not kept in mind the value of technical education is misjudged even within our own guild.

To go a little farther, the engineer of to-day not only must be practical as well as theoretical and theoretical as well as practical in the field of Engineering, but he must be practical in the field of business.

We admit at once that the engineer should constantly have in mind the obtaining of an adequate return on investment in connection with his engineering designs and enterprises. Then it follows that the engineer-student should have some instruction along these lines, including as a foundation the principles of accounting, depreciation, shop-cost, analysis of data, law of contracts and business methods in general.

At least the student should be convinced before graduation that to succeed really in his profession he must practice within commercial limitations.

In this connection one good sign of the times is that a number of our best engineering colleges now call in practical, commercially successful engineers to lecture on engineering practice.

But, first of all, we must be sure that our students are thoroughly grounded in the fundamentals of science and mathematics, and the constant pressure to extend the curriculum should be resisted where it threatens this thoroughness in elementals.

In teaching even these elementary subjects, practical applications should be employed. Where apparatus is used the students should be required to set it up and follow as far as possible the lines of original investigation. The cut and dried element should be reduced to a minimum. We should cultivate in our students the power first to reason and then do, rather than to memorize equations and the like. The memory should be cultivated not by the effort to store a mass of dry facts, but in connection with the exercise of the reasoning powers.

Of late years there has been much unrest in regard to technical education. Constantly it has been the object of investigation and criticism. This has been largely the result of the late marvelous progress in Engineering Science and the effort to reflect this progress in the work of the technical schools.

Much good has resulted and some harm.

As new applications of Engineering Science have developed, the effort has been made to introduce them into our engineering courses, until these new applications threaten to crowd out the very fundamentals.

Too often, even in the case of capable students, there is not sufficient time left for recreation, meals and sleep—that is, for the maintenance of full physical vigor.

And this crowding of the curriculum and the introduction of educational fads is to be found in our preparatory schools and has already resulted in superficiality.

In preparatory schools and technical colleges the students are taxed beyond their powers until their minds are numbed.

Certainly, then, no farther additions can be made unless balanced by equivalent eliminations.

It has frequently been proposed to correct this trouble in the technical schools by adding a fifth year.

But this could be only a temporary remedy, for new applications of Engineering Science will continue indefinitely to be developed.

Nor can our entrance requirements be materially raised in view of the fact that the preparatory school students are already strained to the limit.

Let us then acknowledge that the race is an unequal one and that there are limits to our students' power of endurance.

Unquestionably, it would be of great advantage if we could give our undergraduates training in all practical applications of Engineering Science, but, as this cannot be, we must console ourselves by reflecting that after graduation they will settle into specialties and perfect themselves therein in the school of experience, supplemented in some cases by post-graduate work in the university. We can still further console ourselves by investigating the records of our Alumni.

Stevens Institute, for instance, furnishes its students only a single prescribed course, with no electives. Its secondary title is "A School of Mechanical Engineering," which seems to indicate a rather narrow specialization.

Still, the Alumni Directory shows that its men are occupying nearly every class of position in the field of Engineering.

Three notable examples taken from the list of Alumni will serve to show the wide range of professional work performed on the original, fundamental training furnished by the Stevens curriculum of twenty years ago.

One of these, an eminent authority on Dock Engineering, has been active in the entertainment of our guests; another is this year's President of the American Institution of Electrical Engineers; the third is this year's President of the American Gas Light Association.

Let us recognize that the days of the Greek and Roman civilization, when the educated man was expected to absorb the whole store of knowledge, have passed. Now we must be satisfied to know a little of many subjects and be a master of one.

Nor need we engineers, if we follow this line of thought, fear to be criticised for being narrow specialists. This condition applies to all the world's workers.

Those who so criticize us may know a little of many things but probably they are master of none.

But when we claim that thoroughness in a particular line does not necessarily imply narrowness, we must be sure that our engineer-students are held to as strict an accountability with regard to their general studies as to their technical studies, and especially so with regard to the study of the mother tongue.

It should be recognized that on account of the heavy pressure under which they work, these students are disposed to slight the general subjects of the curriculum. Then the professors and instructors in these departments all the more should be selected because of their enthusiasm and ability to interest their classes.

While referring to the instructors, let me say that I agree with Professor Perry, of England, that all the engineering professors in a college of engineering should not only be permitted, but required, to practice their profession: and this for three reasons:

First.—That they may be better qualified to give practical instruction;

Second.—To reduce the chances of their growing stale as teachers; and

Third.—That men of higher caliber may be secured.

By better teaching we stimulate better learning.

Because our students are worked to the limit of their endurance, no effort should be spared to include in their college life everything available that may tend toward legitimate recreation and the cultivation of college spirit. To this end we should have attached to our engineering schools, Dormitories, Commons, Unions and provisions for reasonable attention to Athletics.

Besides forcing these men to an unvaried grind of technical work, we should give them the opportunity to develop, through contact with their fellows outside of the class-room, but during this period of great mental activity and receptivity, breadth and the capacity for dealing with one's fellows.

We have of late been thoroughly inspected as to our teaching methods by Mosely Commissioners and individual investigators from abroad.

I am sure these investigations have been profitable to investigators and investigated alike. But in one point at least I think nearly all the investigators fell into error, namely, in forming the opinion that we in the United States have been sufficiently supported in our efforts to advance technical education by the generosity of our rich men as a class.

I hold that this is quite opposed to the facts.

It is true that we have a few notable examples of such philanthropy, but many of the benefactions have not come from rich men and therefore have been individually small.

Stevens Institute has received practically all of its endowment from three men.

One (the founder) a pioneer engineer; the second its late President, who made his modest competency by the sweat of his brain; and the third a man who owes his vast wealth to unique success in the industrial field.

This country undoubtedly owes its prosperity in considerable measure to the work done by its technically educated men, and this I affirm while having clearly in mind the many other agencies resulting from our geographical position, political institutions and Nature's prodigal benefactions.

In this prosperity all classes have shared. Of our rich, the bankers and merchants have profited as well as those directly interested in industrial pursuits. But it is not often you will find that the merchant or banker has returned to technical education even a small percentage of that which technical education has given to him.

And the cases are almost as rare among those who have acquired their wealth directly from industrial pursuits.

The credit should be given to the few rich and the many more of moderate means who have supplied the endowments and to those who have so efficiently administered those inadequate provisions. I personally know of cases where large returns have so been obtained from relatively small endowments at the cost of long-continued, heartbreaking worry and final collapse of those in active control.

When in studying our own needs and possibilities and then looking afield to our sister institutions, I see how much more could be done for the struggling young men of this country and for the relief from crushing cares and responsibilities of the workers in this field if the rich men of the country would as a class recognize their debt to technical education, I for one do not propose that credit shall be given where it is not due without raising my voice in protest.

In conclusion, let me say that in spite of their faults and weaknesses, some preventable and some not so as yet, one thing can be claimed for our technical schools:

They are doing a grand work for the country and mankind.

The President.—Gentlemen, the next and the last toast is "The Law." Every engineer knows that constructive emergencies and situations have laws of their own which cannot be disobeyed if success is to follow their work. The speaker will differentiate to you between these several laws. The engineer is a law-abiding citizen, and takes his instructions from that great science, an expounder of which will now address you, the Honorable William W. Porter, I have the honor to introduce to you.

THE LAW.

Hon. William W. Porter.

Mr. President, and Gentlemen, Members of a sister profession. The hour is late, I bid you good morning. I am under contract to speak for ten minutes, and no more, and I am just within a few moments offered a bonus to cut it down by the minute.

I do not wish to sail here under any false pretences. It has got abroad that I am a sitting judge. It is true that I did sit on the Appellate Court in Pennsylvania for a number of years, and there acquired the habit of silence. I resigned from that and still cultivated the habit. It was before the Democratic Convention, but it had no relation thereto. (Applause and laughter.)

Gentlemen, after I received the invitation in writing, with certain limitations as to time which I have alluded to, I found I was up against a proposition of a very serious magnitude, and the first thing that impressed me was my colossal ignorance of everything relating to engineering. So bad was it that I went to a Standard Dictionary to find out what engineering is.

Now, I speak seriously when I say that I have listened to-night and heard from the lips of one of your most distinguished guests one of the best after-dinner speeches I have heard in years. (Applause.) I have enjoyed that with you, but I have had a comfort in it that you didn't have. He *facile princeps* was compelled to define an engineer. (Laughter.)

What is engineering? Listen to the dictionary. (Laughter.) This is it, *in hæc verba:* The putting through or managing skillfully or by contrivance and effort. (Laughter.) And after all this laudation of gentlemen engaged in doing something by contrivance and effort. (Laughter.) I know of no collegiate degrees founded on those claims, but see here, the nomenclature of this science is getting very complex; the names of the engineers are by no means clear as indicating their purpose in their profession. Here I was led away from the dictionary and went to a more pleasing source. I took a lay woman and asked her what she thought the following designation of engineers meant, and the first thing I asked her was, What do you think a mechanical engineer is? "Oh," she said, "an automaton."

(Laughter.) Then I asked her, Well, what is an electrical engineer? "Well," she said, "that may be a storage battery or a dynamo." (Laughter.) Then I asked her, What is a marine engineer? And she thought for a moment. "Well," she says, "that is descriptive of the most innocent and ignorant class (Laughter), because from time immemorial, when we are telling something beyond credence, we refer to telling it to the marines." (Laughter.) Then I asked her, What is a sanitary engineer? "Well," she said, "I think that must be a healthy sort of person, perhaps by his own presence having some hygienic influence." And then I went back to my dictionary to find out what a civil engineer is.

Now, you cannot find it defined as it should be, so I went to the adjective "civil." What does that mean? It means a person who is pre-eminently careful and observant of all the amenities of social life. (Laughter.) Coupling that with the word "engineer," you have your description, and as to the civility of every one, the guests to-night, as well as I hope the hosts participant, have had it proven on this occasion, but the list is not complete. Why, we have got more engineers than that. We have got in America, we have got what is known as a political engineer. (Laughter.) That is synonymous, perhaps, with "boss." More than that, we have financial engineers, and the lady to whom I spoke asked whether that was not included under the term "hydraulic engineer" because of the water. (Laughter.)

But when my dictionary had sufficed so far, I went a little further by some accident, and I found another definition for an engineer. "A plotter," and a plotter with oblique morality, and it is a fact, Shakespeare himself seems to have a very low opinion of you, because, as you will remember, in Hamlet, after the killing of Polonius, Hamlet makes certain arrangements with certain persons of evil design, and finally ends by saying, "'Tis the sport to have the engineer hoist by his own petard."

Well, now, gentlemen, if you will bear with me, I want to make my bonus if I can—if you will bear with me I want to say that, having now demonstrated my absolute ignorance of everything connected with your profession, and having diplomatically put myself, by adverse criticism, wholly out of touch with everybody, I have moved by these stages up to the topic which has been assigned to me, namely, The Bar. (Laughter.) I had a serious purpose, gentlemen, when I came here, but the hour and the occasion and the limitations of contract lead me to observe that "A little folly now and then is relished by the wisest men."

Now, the Bar. Well, if I could not make you fatigued by just a little essay on the Bar, with a few extracts from Coke or Littleton, and perhaps drawing something from our own judges, even the sitting as well as the dead, I think you could sleep sounder, but I propose to avoid that proposition and just to touch for a minute or two on one or two curious episodes or incidents which have come to my attention recently, which go rather to the lighter side and relieve that stress which all judges and all lawyers are under.

There was a gentleman of the Bar, (I will not say of which County or State) who prided himself on being a great cross-examiner. One of the greatest English judges said in respect to cross-examining, "When you want to cross-examine, don't." This gentleman had upon the stand a yokel, an ignorant lad or young man, and had pinned him down so that he had got an admission which he wanted, and then asked this question: "And so, after all, you are nothing but an idle, good-for-nothing vagabond, isn't that so?" To which there was a good deal of silence. Then he took another tack. "Well, what does your father do?" "Well, he doesn't do nothing either." "Then he is just the same idle vagabond that you are, is he?" "Well," he said, "you can ask him; he is in the jury box." (Laughter.)

There was another funny slip of a word by a young lawyer who was very earnest and was trying, on the criminal side, a case of bigamy. He had earnestly urged the acquittal of his client, but in order to make the status of the law particularly clear to the jury, he said, "Gentlemen of the Jury,—" and he was in some haste, more haste than I can articulate in—"Gentlemen of the Jury, a man can get greatly complicated in his marriage relations. Under the law of this country, there are three ways that a man can be married. There is such a thing as polygamy, and that does not keep a man out of the United States Congress; (Laughter) but there is such a thing as polygamy, and that is when a man has got a plurality of wives. And then when a man has got two wives, that is bigamy; but when a man has only got one wife, that is monotony." (Laughter and applause.)

It is sometimes said, you know, that lawyers, by their education perhaps, or by the inheritance from England, have a circuitous way of answering any direct question of a client, and perhaps it is true. I think one of the best illustrations of an indirect answer which is peculiarly clear was given in a little rhyme which went current about a year or two ago, which you will remember. It recounts the proposal of a young man and his answer from the maiden. It runs thus:

"A young man asked a maid to wed.
"Go ask Papa," the maiden said.
The young man knew her Pa was dead;
He also knew the life he'd led;
He understood her when she said
'Go ask Papa'." (Great laughter and applause.)

Now, gentlemen, I really feel that you have paid me a great compliment in listening to me without being wearied, and I want you to bear with me one minute more, and I will not trespass on your want of intellect further; I want a serious word, if I may, before I sit down.

Sometime ago I had the honor in my native city —or town—I say that in New York, town of Philadelphia. You observe that, differing from my Boston friend, that is the first time I have told you where I came from. (Laughter and great applause.) I want to add in this connection that there is not a bust of a big man that has lived in Philadelphia whose bust and name is not known and honored. (Applause.)

One word seriously. Sometime ago in the town which I have named, I had the honor of participating in a welcome to that great English jurist, statesman and diplomat, Lord Herschell, and I had the pleasure on that occasion of suggesting the thought I conclude with.

No man can be otherwise than blind who has not seen cropping up, wherever Englishmen and Americans have met, officially or socially, a growing tendency, a warming up, a fraternizing in the last few years, which, perhaps, did not exist before, and we have been thinking, on both sides of the sea, why that may be. It has been suggested that the common language is drawing us. I believe it is not so. It has been suggested that the common blood draws us. I believe that that is not the reason, for Americans, if they are anything, are composite, with a large preponderance, perhaps, of the Anglo-Saxon. It is said that the literature, being in common, has drawn us together. I think that is not the real cause. Others have said that commercialism is binding us closer, and I say, God forbid; let it be on a higher level. There is one thing that I believe lies at the root of this fraternalism which shall have no evanescent being, but which shall last and grow, and it is found in this, that at home— may it be, shall I say, as others have said, or here in the new home, the same fundamental thought of right and justice exists. (Cries of "Hear, hear" and applause.)

The same methods of judicial determination are existing in both countries. No man there or here can be brought before any court of administration; no man there or here can be tried save by a jury of his peers; no man there or here can be stripped of liberty, life or property, without due process of law, under the eye of a trusted chancellor or judge. (Applause.)

When I say that to you, gentlemen, I must set you back of the position of the Bar and Bench; I must set back the profession of war, whether on the water or the land, and put first the profession of the law, which secures to every man, in every profession, in every business, equitable determination and protection of his rights. (Great applause.)

The President.—Gentlemen, your patience for a few moments longer. We have had the pleasure of hearing from Boston, from New York and from Philadelphia. We have yet to hear from the Windy City of Chicago. I will have the pleasure to call upon Mr. Robert W. Hunt to tell us of that city. (Applause.)

Robert W. Hunt, M. Am. Soc. C. E.

Mr. President, Fellow Members of the Institution, and Fellow Members of the American Society: This is an unexpected honor—an unexpected honor for my city in this city (Laughter), and therefore, sir, you, knowing as well as you do, as you are close residents to us, how loath we are to speak of ourselves, will sympathize with me in restraining myself to almost the words of simple thanks; but in making them, it is my pleasant duty to extend the words of welcome to our foreign friends.

It will be our fortunate pleasure to show them that city. I am no prophet and I am loath to make predictions, but if we cannot give you better weather than you have had here—(Laughter) fortunately you are only going to be with us two days and, therefore, our task will not be so great, but all the tears and all the water which you will see shed there will be upon your departure. (Laughter.)

It is a great pleasure to me, Mr. President and Gentlemen, to add just these few words to this welcome which is extended to-night, because it was my great, good fortune to participate with the American Society or its representatives in the welcome which the Institution gave to us in London in 1900, and who that participated will ever forget it? (Cries of "Hear, hear.") To you Englishmen, you cannot appreciate what it was to us, but perhaps the thing of all, which we will remember the longest, was that glorious day at Windsor. There, on that classic spot, and under those magnificent oaks, and under those historic towers, to receive that gracious welcome from the noble woman, your Queen of blessed memory, is a thing that no one who participated will fail to remember as long as memory lasts to him. It was, perhaps, a greater occasion to us than it could possibly be to you Englishmen who participated with us.

We cannot offer to you welcome to the classic scenes that you gave to us and opened to us. It is all new that we ask you to look at. There it was with reverence, and memory dating back through the centuries that we paid our visit.

Now comes the question, is the new better than the old? And it is our duty to try to make it so. Whether we are performing that duty, we have to leave it to you to judge.

It is true, as has been said, that we are of a common heritage. Perhaps England and America have not always exactly agreed. I think history shows that we have had some troubles—and what family has not had trouble—and I believe it is also, and may it always be so, that let those quarrels and those troubles be as severe as they may, it is not pleasant for the outside party to interfere. (Laughter.)

We, in our own short history, have had severe family quarrels. The North and the South disagreed; it brought sorrow and it brought bloodshed; but, thank God, that has passed. Our heroes who laid down their lives for the North are to-day also the heroes of the South, and their heroes who died are to us cherished memories of men who gave up all in the defense of that which they believed to be right, and the very blood that was shed is the cement that to-day binds together our nation. (Applause.)

So, why should it not be between you and us? Why should we not be bound together? Those flags (our President alluded to them); they are hanging together. Why should they not always float together? (Cries of "Hear, hear.") Look at them! The colors are the same, arranged differently, perhaps, but no foreign tint is there. (Applause.) It is the red, white and blue. (Cries of "Hurrah!") They have always been and they always will be, sir, glorious flags under which to live and prosper, glorious flags under which to fight—aye, and if need be, to die. (Applause.)

SIR WILLIAM H. WHITE.—Gentlemen, I am not going to appeal to your patience; I am going to give you pleasure. I ask you, without any words from me, to drink to the health of the President of the American Society of Civil Engineers, and you, Englishmen, show what Englishmen can do in three cheers to the health of the President of the American Society of Civil Engineers, Mr. Hermany, our kind host and friend.

(Three cheers given.)

INTERNATIONAL ENGINEERING CONGRESS

UNDER THE AUSPICES OF THE

AMERICAN SOCIETY OF CIVIL ENGINEERS,

ST. LOUIS, MISSOURI,

OCTOBER 3d to 8th, 1904.

REPORT IN FULL OF THE OPENING AND CLOSING SESSIONS

OPENING SESSION.

The International Engineering Congress, held under the auspices of the American Society of Civil Engineers, convened October 3d, 1904, in Congress Hall, Administration Building, Louisiana Purchase Exposition, and was called to order by Mr. Henry S. Haines, Chairman of the Committee in Charge, who spoke as follows:

Somewhat more than a year ago, the American Society of Civil Engineers was invited by the Board of Direction of the Louisiana Purchase Exposition to undertake the arrangements for an International Engineering Congress. The Board of Direction of the Society appointed a Committee of its members, and this Committee invited the co-operation of the other National Engineering Societies. But for some reason satisfactory to themselves, they did not entertain the proposition favorably. But as the responsibility for the successful inauguration of this International Congress rested with the American Society of Civil Engineers, in fact, had been placed upon it, by the management of the Exposition, the Board of the Society determined that the Society would undertake it alone.

A Committee of Organization was appointed, and that Committee determined to confine the discussions of the Congress to a few live topics, rather than to endeavor to cover the whole field of engineering, and to provide for a profitable discussion of these topics, the Committee invited leading papers upon them from engineers of recognized eminence in their respective countries. There has been a very gratifying response to the invitations of the Committee. We have papers from engineers not only in our country, in North America and in South America, but from the three other Continents of Europe, Africa and Asia; from the shores of Great Britain, and from France, and from those of Japan. I think, therefore, that this Congress may well lay claim to being an International Congress, and we may hope that the oral discussions in its several Sections will be of great interest as indicating the experience and the most recent practice of the distinguished engineers who are here present with us, including a delegation from the Institution of Civil Engineers, with its honored President, Sir William White.

As Chairman of the Committee on organization, I have now the honor to introduce as the President of the International Engineering Congress, Mr. Charles Hermany, the President of the American Society of Civil Engineers.

Mr. Charles Hermany.—Gentlemen, engineers of all nationalities, speaking many different languages, from all quarters of the globe, hailing from countries whose histories are chronicled in the lapse of centuries, Slav, Teuton, Mongolian, Gaul, Latin and Anglo-Saxon, I greet you all as brothers. You have come to us and have assembled upon a spot where an epoch in our national history was made, where to this day there has been but one hundred years of civilized government; in a territory the acquisition of which by peaceful diplomacy, that made our then infant republic extend its dominion from the mouth of the Kennebec River in the East to that of the Columbia in the far West, from the Atlantic to the Pacific. The Louisiana Purchase, in the annexation of which our first move toward territorial expansion, our first step in the direction of a world power, was made; a territory whose brief one hundred years of eventful history fills us with pride, since it has proved the key which unlocked the portal and swung back upon its hinges the western gate that has admitted our star peacefully into the role of empire; this place, from which two of our pioneer engineers, Captains Lewis and Clarke, commenced, conducted and completed an exploring expedition to and from the Pacific Ocean at the mouth of the Columbia River, that was the most remarkable in the history of the world; here, of all places in our country most suitable, we have chosen to hold an International Engineering Congress, the peer of which the future alone can produce, and to which it is my privilege and honor to bid you a hearty welcome.

We meet in a city improvised as if by the wave of a magician's wand, for the display, examination and study of the fruits of agriculture, commerce, manufacturers, art and science from all the world; where we feel the poet's "One touch of Nature" that "makes the whole world kin," and the engineers thereof brothers; under environments that stimulate us in our deliberations, and enable us to link the past, present and future into a chain that binds ages and races of man into a common brotherhood, and their civilizations into a common story or into a drama of many *personæ.* Here we are in touch with the best of research and conclusion, of thought and action, of word and deed, of endeavor and accomplishment, and of hope and fruition, that the engineers of the world have to offer. We are here assembled to enjoy the heritage bequeathed by the past ages and to prepare the way for those to come; to see, weigh and measure each other by the varying standards of our respective selections or contrivance; and to see and esteem ourselves as others see and esteem us; in fine, we are here to move the world, not with a lever from the fulcrum sighed for by Archimedes, but by the consensus of modern thought and the combined use of all the material agencies through which we strive for the ultimate complete dominion of mind over matter.

At the time of the Louisiana Purchase, this place where we are assembled was a wilderness, more than a thousand miles west of our center of population. It is now but a few hundred miles west thereof, and will, ere two decades shall have elapsed, claim, not only the center of population, but also the center of wealth.

You thus perceive that we have invited you to join us in the celebration of the first centennial of an epoch in our history that is not paralleled or eclipsed by any in the world's history, for it led to the establishment of the predominence of the Anglo-Saxon over the Latin race on the American Continent. I mean no disrespect in the statement of this fact. I simply state it in modest pride, with due respect for all nationalities and especially for the Latin race. When it is remembered what has been accomplished since the purchase of this territory, what remarkable development and building up of cities and wealth between here and the Pacific Coast, you will pardon me for indulging in this self-congratulation as to the power of our country and of our people. And permit me to tell you that we feel all the more proud because it was accomplished by peaceful diplomacy and but partly by destructive wars. The patriotic emotions which the memory of this Louisiana Purchase epoch arouses in our hearts, causes me to entreat you to join with us in our song and jubilee, yea, shout with us, for the glory of a Republic which has become an Empire, without the loss of virtue, liberty or independence. The purchase of this territory was the beginning of a policy which has made us a great republic, and was principally the work of one of our great men, who was a seer in statecraft and a colossus in executive official courage. In the deliberations and discussions of this Congress we are realizing events anticipated by his prophetic vision. If, by the assistance of the deliberations of this Congress we shall open the second century after this important epoch in our history, it will have proved to have been a most auspicious event. It has brought together men of thought and action, pioneers, conservators and promoters of the highest civilization the world has known. The fact that from all points of the compass men are here to participate in the work of this Congress shows that it is an undertaking that has at its bottom as a foundation the welfare of all the people of the world. For we have engineers from all countries, men who have contributed their knowledge, experience and their speculations, brought here to be in a measure adjudged before a tribunal that has not its superior though it is but a voluntary assemblage of but a few years' effort of creation. Therefore, I heartily congratulate you each and all upon this auspicious event, and I express the hope that we will mutually understand each other, and, when we have concluded our labors, we shall have promoted the cause of engineering, that we shall have strengthened every brother of the profession present, not only in the requirements, but in the firm belief that each one has a most exalted mission to fulfill in the world's history. We, as members of the profession, however earnest, thoughtful and industrious, too often lack enthusiasm, trusting to desirable results following from reasonable effort. That is sound philosophy, but success does not always crown reasonable effort. Enthusiasm and extraordinary effort is too often the price of success and victory. We confidently expect when the work of this Congress shall have been completed our fondest hopes will have been realized, and that, when it shall have become a part of the engineering literature, it will prove a depository of ten years of progress in our profession, in which there has been accomplished as much, if not more, than in any preceding decade. Therefore, I congratulate you upon this auspicious event.

Mr. D. H. Francis, the President of the Louisiana Purchase Exposition was to have addressed you next in order. A death in his family prevents his attendance. Mr. F. J. V. Skiff, Director of Exhibits, will respond in place of Mr. Francis.

Mr. Frederick James V. Skiff.—Mr. President, Ladies, Members of the Congress and Visitors; it is a difficult task under any circumstances to appear to the satisfaction of others in the place of President Francis. I, usually, in fact, always, regret if circumstances compel me to do so. Therefore, I regret it this morning, because as your President has said, Mr. Francis is absent on account of the death of his uncle, who stood much closer to him than that relationship usually does.

However, the exposition management could not permit an assemblage of this distinguished character to gather together without some expression of its unusual gratification. The Congresses and different International and National gatherings that from time to time are meeting at this Exposition number in the total about four hundred, and of how much greater value this register of universal opinion and judgment and thought will be than the mere exposition of material things, you, gentlemen, are as capable of judging as we are, we think, of estimating. This Exposition, I think, will appeal to all students, scholars, professional and technical men, as having a higher nature or educational mission than any similar undertaking. In fact, it is the basis of our labors and the hope of our toil. The Exposition in a material sense will pass away to-morrow, in a day, and the memory of contemporaneous people will sustain it as a record for only a short time. But the record of the thought that created the Exposition, not referring to the management, but the record of the thought through which these material evidences of man's condition and society's condition at this time—that record becomes an asset that will build and sustain the ages.

Unprepared, as a man should be to address a meeting of this nature, as I am, I shall not presume, ladies and gentlemen, to do more than extend you the cordial welcome of the management. An opportunity of this character, to say something to receptive minds, to get men of thought and push and progress in sympathy with what you may have entertained with reference to the affairs of society at this time, and of the importance of professions in its development, is an occasion that I would have welcomed very warmly. But, as I say, in justice to you and in fairness to myself, I must not follow in a rambling way the fugitive thoughts that occur to me. I have just this moment received the suggestion that I appear in behalf of the President, and I left an important committee for that purpose. However, no matter how accidental, and, under the circumstances, how painful my appearance here this morning may be, I desire to confess to you the honor I experience in addressing such a gathering. In behalf of the management, let me assure you that the Exposition appreciates a meeting within its domains of such a magnificent company of people, both in its personnel and in its relationship to life. We see the evidences of your accomplishments everywhere about these grounds. It is almost trite to say that there would have been no progress without the engineers. We thank you for being present. We highly appreciate the representative character of this meeting. We trust that your deliberations will be attended, not only with the intellectual and scientific results that you aspire to, but to your own personal comfort and satisfaction, and anything that this Exposition can do to contribute to that end, let me assure you on behalf of the President, the Exposition is entirely at your command.

The Chairman.—The next thing in the way of an address comes from a gentleman who has been amongst us but a few short weeks, less than a month, but, in that brief interval of time, his association with us has endeared him greatly to us as a people and particularly as engineers. The birthplace of such a man cannot be wrong, no matter upon what spot of the globe it may be found. England is proud of him, and, had his place of nativity been in the United States, though he could not have contributed perhaps as much as he has to England, it would nevertheless have made us prouder and endeared him to us all the more. It is not necessary for me to introduce Sir William White to this audience. He is too well known. Sir William, will you kindly take the stand.

Sir William H. White.—Mr. President, Ladies and Gentlemen: It is impossible for me to express my sense of obligation to you, sir, for the very kind terms in which you have spoken of me and of my work, and I rise, not to refer to any personal work or merit or demerit of my own, but at your request to speak on behalf of all foreign engineers taking part in this Congress. To be asked to undertake that task is a very high distinction. This Congress has brought together, as you have said, sir, engineers of eminence from all parts of the civilized world, and its proceedings will contain contributions from men who have distinguished themselves in the several branches of their profession and who here put before this Congress their matured thoughts and the record of their experience. And to speak on behalf of such men before such an audience is an honor that I most highly appreciate. I suppose the fact that I have been asked to do so is chiefly due to the circumstance that this year I am the President of the Institution of Civil Engineers, and it is to me a great happiness that in this year of office it has been marked by many new departures and has led me to come to the United States for the first time in my life and here as the representative of what is the parent Society of Engineering in all English-speaking countries of the world to join hands with our American brothers. And I am sure I may venture to go one step further and to say that all the foreign delegates present here from all other countries heartily share in the feeling of regard and respect which I have endeavored to express on behalf of the English Engineers toward the American Society of Civil Engineers, whose guests we are on this occasion. The Institution of Civil Engineers is trying to the utmost of its power to show the respect which it has for the American Society of Civil Engineers, and, as I ventured to say at our first meeting in New York when you were so good as to receive us, we have done in your honor that which has never been done before in the eighty-six years of its existence, and we have done more for this Congress than we have ever done for any Congress, even including that great Congress held in Glasgow, which was also International. There the Association in its corporate capacity had no appearance. The President of the Institution was President of the Congress and nearly all the Presidents of the several Sections were members of the Institution; but the Institution in its corporate capacity did not appear then. But now, to-day, by the decision of the Council and with the approval of the members, I stand here, sir, to convey to you the good wishes of my friends and fellow members who are present here in numbers to-day, and behind them the good wishes—the best wishes for your success herein of all your engineering work—of the eight thousand members of our Institution, and amongst those eight thousand members there are many of the most eminent men who are citizens of the United States and prominent in your Society. It is a great joy to us to think that wherever we have gone on this continent we have been met by members of our Society, and so we have felt even more at home, because when a man comes to you and you clasp hands with him, although you have never seen him before, there is a common bond, a common interest and sympathy that is difficult to express, but which is none the less real and true. We are old, but we are by no means effete. We are vigorous, which is shown by this long journey we are taking in our old age; and in many directions we are showing signs of life. During the last two or three years steps have been taken by our Institution which mark new departures, new departures which I venture to say, and I say it with all respect, will be followed by other engineering Societies.

We are proud to speak of engineering as a profession. So it is. It is a learned profession, or should be, and the Institution of Civil Engineers has marked its appreciation of that fact by insisting upon a strict educational test embracing engineering education and scientific training in all departments. In the matter of standardization, a thing which affects manufacture and production in a most remarkable way, the Institution has taken steps to appoint a most powerful Committee which has been at work now some considerable time, and many of the reports of which have been placed at the disposal of your Society and will be found here. We may not be able to standardize throughout the world, that is not to be expected, but we are glad to place at your disposal such information and facts and conclusions as we profess and we ask you for an interchange, feeling sure that the experience of this great Continent in its various branches of engineering will be of the greatest value to us.

And then this year, we have taken another step which naturally grows out of that of which I spoke just now, the insistence upon an educational test, and we have again appointed a Committee representative of the Great Engineering Society of Great Britain to deal with the question of engineering education, a matter which has been most thoroughly considered here and where we have been able to learn much and which we all agree must largely affect the future of engineering.

These are only samples of what I venture to say are evidence of vigorous life in an Institution which will soon be ninety years old, and giving me, as President of that Institution to-day, the prominence you have in asking me to respond for your foreign visitors, may I again say that I take it not merely or chiefly as a personal matter, but as a tribute to the dignity of the office which I at present hold.

This gathering, as we all know, is one of a great series. I suppose we may say that the first great occasion of this kind was at Chicago eleven years ago, and since that time there have been similar gatherings in Paris, Glasgow and Düsseldorf, and naturally we come back to this country and the cycle begins again, and it could not begin under happier circumstance or in a more suitable locality.

You have spoken of historical events connected with St. Louis.

To us these are matters of great interest because they had to do with the growth of this great kindred people, but, if I may say so, I think I voice the feeling of English Engineers when I say we cannot come to St. Louis without thinking of Capt. Eads. To most of us he is now only a name, but I think all of us will make a visit to the levee and look upon his great bridge standing there. And we all know of those gigantic works he carried out at the mouth of the river and I remember when only a young naval architect of reading with immense interest the account of what Capt. Eads did in the way of the construction of a flotilla in these waters during the Civil War, a work accomplished under enormous difficulties, under great pressure of time, but done in a manner that fully met the requirements of the situation, and which no doubt had great effect on the results of operations in this region.

These are only a few instances of what we remember of Capt. Eads, whose name I am sure is cherished as that of a great engineer of whom we are all proud and whom we all respect.

And then as to the organization of this Congress. You, sir, on this side having faculties for organization and you had the experience of the Chicago meeting to go upon besides the knowledge that had been acquired from these other gatherings in other countries, but if I may say so, anyone who looks through your *Proceedings* and sees the list of papers prepared by the many authorities can want no further evidence of the capacity, the grasp and comprehensiveness of the scheme which has been laid down for our meeting here. But there is one little touch which I shall venture to mention. I came into the room this morning and saw this diagram on the board giving the particulars of the places of meeting of the various sections. I had, before I saw that scheme of the places of meeting, the greatest admiration for the skill that had been displayed in the organization, but the final touch was reached when I saw that Section G, the Naval and Military, worthily represented by Major Craighill who sits here, was to meet in the room of the Lady Board of Managers. I do not remember any gathering with which I have had to do heretofore where I have seen the proprieties so beautifully dealt with as in Section G, and I am sure with Gen. Craighill at our head, those of us who belong to G will have a good time. Section G is reserved for us. It is only those that belong to the naval and the military that are to join the Lady Board of Managers.

Now, resuming what I have to say about this gathering it is most fitting that these Congresses should be held in connection with such expositions as we have here in St. Louis, and I entirely echo the sentiment expressed by the gentleman who preceded me when I say that on the educational side this Exposition certainly bears a part. It is a proud thing for an engineer to walk about these magnificent buildings, to see the wonderful collections there and to think that he belongs to a profession which has had so much to do with the creation of all these marvels and with the great advances that have been made in every direction for the benefit of mankind. One has to try to cultivate a spirit of modesty because there is such a danger as one sees what has been done of pluming oneself too much and so perhaps becoming ineffective for the future, for a man, in my experience of men, who thinks he has finished learning had better retire from the profession and take something less difficult than engineering. Here we have the latest applications of science, engineers of all countries contributing not merely to show what is the present position of affairs, but to give the means of indicating what are future tendencies in the several branches, and then what is in evidence so much and what rejoices us that we cannot walk through the Exposition without thinking that the old ideas of secrecy and the monopoly in invention is gone and instead we have the modern spirit in which invention legally protected is published to the world. It stands upon its merits and its results decide whether or not it shall be largely utilized. And to meet here with such a gathering as this, a gathering of engineers of eminence from all parts of the world, it is a lesson and not only a lesson, but a great opportunity to all of us. Science and engineering are necessarily and inevitably connected. Their union is indissoluble. I for one refuse to admit that applied science is in any way inferior to what is called pure science. I have the highest respect for a man who devotes his life to a service without thought of commercial result or pecuniary reward; but I say, as I have often said before, that to my thinking a man who takes upon himself the task of doing things—enormous responsibility, not merely for material benefit, but for human life—that man is equally worthy of respect and admiration, and when I hear, as I sometimes do hear, men hold up the example of Faraday and say that is the noblest character who makes discoveries and puts aside the question of personal advantage, I say Faraday is a noble type, but a man who, like George Stephenson, faces the unknown and carries through enormous undertakings for the benefit of mankind is also entitled to equal respect from his fellows.

The engineer must be a man of science. A purely scientific man, devoting himself as he does to tasks commanding the highest grade of the intellect, is free from many cares that press upon the engineer. Let us then go our several ways respecting one another, helping one another, and we may be sure that for that feeling of happiness the world may be better.

And then, as one goes about the Exposition, there is another thing to be seen and that is the marvelous diversity under modern conditions of the tasks of the engineer. There was a time when the Civil Engineer, in his own person, could embrace all kinds of engineering, and did so. He practiced nearly every kind and every branch of engineering. All branches, whether canals of the kind that belong to the end of the Eighteenth Century, or railroads, or bridges, all lay within the grasp and practice of one individual. But how different is it now! We may have some knowledge of many branches, but we all find as the years go on that we become specialized whether we will or not. It is inevitable that it should be so. As in science, so it will be in applied science or engineering. So let us remember always that all branches of engineering are inter-dependent, they are all related. The lines of demarkation cannot be defined. A man may intend to be one thing and come to be quite another. I never intended to be an engineer at all, but somehow I came to be one. I had no one belonging to me that had the least connection with shipbuilding, but I have been a shipbuilder. I suppose it would be called the force of circumstances, but so it happened, and in engineering as a whole men find their place. I do not mean to say they continue all their lives to practice one branch of engineering, but the unavoidable necessities cause men however able to be attached to some special branch of work as the years go on and to distinguish themselves there. And so in this Congress, with its several sections, let us feel that although that is true, and specialization is unavoidable, let us remember that we have the common tie of all being engineers, and that we help one another, that no one stands alone but even the specialist is dependent upon his brethren.

Now, if I may refer to that which I know most about, shipbuilding, just think what the modern ship involves. The modern ship could never be but for the joint action of many branches of engineering. You know you have the Mining Engineer, the Metallurgical Engineer, the Mechanical Engineer, the Marine Engineer, and the Electrical Engineer, all contributing to help the Naval Architect to produce the ship that plows the sea, and defends the honor of the flag. The Naval Architect takes the concrete responsibility, but he avails himself of the skill of his colleagues. And so it is in other ways, and one might multiply illustrations. The truth is we are not divided, although we must be specialized, and that, I think, is the great feature of our Institution and of your American Society that you do not exclude any branch of engineering from membership, that a gentleman who is accomplished and competent in any branch of engineering, is with us and I believe also with you, entitled to the privileges of full membership. I have sat in the chair at the Institution of Civil Engineers during the past year and listened to discussions of the most diverse character, and I have never on a single occasion failed to get some good, some idea, some suggestion, some additional information that would be helpful to me in my own work. And then, if I may go one step further, I like to think on this occasion how one nation helps another, not merely how one department of engineering helps another, but how one nation helps another. We, in England, have grown to be the great shipbuilders of the world. We are proud of it. We claim it, we know we hold it, and we intend never to sacrifice it as long as we can hold it, but we do not forget that we owe our knowledge of the theory of naval architecture to our French brothers. The French, in naval investigation, were leaders, and they to-day remain in the forefront of investigation, and we, who learn so much from them and who now endeavor to equal them on the theoretical side, I think, in our turn, have been able to give some service in the department of the practical art of shipbuilding. And so in America. I like to think of what I claim we have in England, in "the old country," of some of the things which are reckoned as belonging so peculiarly to the United States. Take, for instance, the America's Cup. Everybody knows that the America, which took the cup, was designed by a gentleman named Steers, who was born in the United States. That you all know. I am bound to say you can all tell me that, but I wonder if you all know, as I do, that the Mr. Steers who designed the America was born a week or two after his mother landed here, and that his father was born in our own little town. I will leave it to you to say how much claim we have on Mr. Steers, and I shall not enter further into that discussion.

Now, of course, in relation to Engineering in its great development we can fairly claim that we have done most, as was said by the gentleman representing the Exposition, we have done most—I think it might be more modest to say much, toward all the modern changes that have been beneficial to humanity. It is extraordinary when one thinks of what work the engineer has done in the promotion of the knowledge of one nation by another in the maintenance of peace, in the development of the forces and resources of Nature, in all that makes for the good of Mankind. And that is the side, I think, we should be most inclined to dwell upon, the benefits that engineering confers upon our fellow-creatures, the waste places of earth made to blossom, distance annihilated. My life has been largely connected with the construction of warships, and perhaps it may seem a funny thing for me to say that that is the side of engineering of which we should be most proud and I am going to make a claim that will astonish you. I am sorry to deal with a personal matter, but I cannot make my point without doing so. It has been my fortune to spend more of the public money of England upon naval armament than any man who ever lived, many times over. After spending $500 000 000, which was about the expenditure that I had to be responsible for during my tenure of office, upon warships and armament, it may seem strange that I should lay claim to having done much for the maintenance of peace, but I do make that claim, and I do it for this reason: There is an old Latin proverb which we always had before us at the country school at Portsmouth, "*Si vis pacem para bellum,*" "If you want peace be ready for war," and I can say, personally, that the possession by England of a great navy has been the cause of the maintenance of peace on many occasions, when otherwise peace would not have been kept. The policy of England and of the United States is that of peace, but no one can hope for continuous peace, as the world is, who lies open to attack which cannot be met, and so I venture the claim that even on the war side the same might be said of military matters. There, the engineer is just as essential as in the building of warships, whether it is the production of guns or ammunition or explosives, whether it is the production of the means of transport, including the latest development, the traction engines, which we used so much in South Africa, or the electrical equipment, a modern army is impotent without the work of the engineer, and there, again, while I deplore that it should be necessary that these large sums, which could be so much more usefully employed in developing peaceful industries, should have to be expended in warlike preparations, yet as the world is, taking human nature as it is, the engineer who devotes himself to warlike work, in my judgment, can fairly claim to stand among the peace-makers.

Ladies and Gentlemen, I fear I have been too long, but I do wish before I sit down to go back to that idea, that we engineers throughout the world are brothers in arms fighting against the adverse forces of Nature, turning them into useful forms, taking the great waterfalls of this country and harnessing them into the service of Man. We have just been to Niagara, and there on both sides we saw those wonderful works proceeding which will turn those magnificent falls into the service of Mankind on an even more extensive scale. In Toronto I was speaking to that great English professor, Goldwin Smith, and he said to me "If you are going to Niagara, I hope you will say to them 'don't let that beautiful wild spot be spoiled by great engineering operations.'" When I got to Niagara I found that the Superintendent of the Canadian part was a Civil Engineer, a member of our Society, and there was the engineer, and one of his great preoccupations was that when those works are completed Niagara shall be as beautiful as it is possible for human skill to make it. That is a part of the scheme. It is not necessary to make things ugly to make them useful, although some people act at times as if they thought it was. That is the idea, brotherhood of engineers, brothers in arms. I like to think of Engineering as a great and splendid tree. Its root strikes deep into the thoughtful soil of Science. Its main trunk lies in the idea of subordinating and utilizing the forces and products of Nature in the service of Mankind. Its branches ramify in all directions, and are continually throwing out fresh shoots as new demands arise and new things have to be met, and behind it all lies the fundamental idea that all Engineers have one common object, the service of Humanity.

CHAIRMAN HERMANY.—I will now call upon our foreign representatives to say a few words upon this occasion. We sincerely hope that they will respond in the order called upon.

The first gentleman who will address you is M. Loicq de Lobel, Delegate of the Société de Geographie, of Paris.

M. Loicq de Lobel.—Mr. President and Gentlemen of the International Engineering Congress: You know with what difficulty a Frenchman attempts to speak the English tongue correctly; and, therefore, you will permit me to use my mother tongue to express to you the great pleasure and satisfaction that we have to be with you because you are noble representatives of the "Genie Civils" of all nations, and I can say without fear of contradiction that the greatest works of the past century are represented in this body by those who were their inspirers and executors.

I have visited some of your Universities, and have seen what you are there accomplishing through improved methods in instructing engineering students to combine theory with practice.

I am sure that this Congress will produce good results in the development of the "Genie Civils" and in cementing a more intimate union between all engineers of the world.

I hope that you will find early another occasion to hold such a Congress, next time in France, when we shall make efforts to give to you the same cordial reception that you have accorded to us here to-day.

Chairman Hermany.—The next gentleman who will address you is Herr Oswald Ehrlinghagen, of Germany.

Herr Ehrlinghagen spoke in his own tongue, and his remarks were not reported.

Chairman Hermany.—You will next hear an interesting address from a distinguished citizen of our sister Republic, the Argentine Republic; a gentleman who has grown honorable and eminent in the pursuit of the great Profession of Engineering; one who will impress you as one of the veterans in this grand profession. I have pleasure in introducing Hon. L. A. Huergo, of Buenos Aires.

Mr. L. A. Huergo.—Honorable President, Ladies and Gentlemen: To voice the importance of this Engineering Congress of the World's Fair held at St. Louis is useless, because your own presence here testifies sufficiently to it, you who have come from every part of the world to take part in and to evince your interest in this International Congress of Engineers, and to witness at the same time the results of the accumulated and combined effort of Humanity as displayed in this Exposition.

I have come from the Argentine Republic, and have been traveling I may say two months, for I stopped in London *en route*, and from there had to come through Canada to reach New York, and finally to the St. Louis Exposition.

I cannot prophesy what the results of this Congress will be, because my time here so far has been given to learning what I could, and I have had no time to form conclusions.

I have been given, through the courtesy of the American Society of Civil Engineers, at New York, the privilege of inspecting some of the principal engineering undertakings there. I have visited the Subway, the Navy Yard, the West Point Academy, and some of the engineering shops, electrical and otherwise; and I have admired the great kindness and complaisance with which I have been everywhere received.

have collected a great deal of information about the transportation questions which are so all-important throughout the whole world to-day, and upon the practical solution of which depends every industry.

I have had great pleasure in visiting this gathering, composed as it is of so many English, German and French engineers, as well as those of other nationalities; and I believe that the Engineering Profession combined hold within their hands greater powers and possibilities than did the Olympian Gods of old.

I have had the great pleasure—which alone would have compensated for all the labors of my travels—of shaking hands and exchanging a few words with Thomas A. Edison, and I consider that such a man, who has helped us to achieve that which a few years ago would have been accounted impossible, is worthy of a place higher than that accorded to those pagan gods.

I have been to Washington; and am under great obligations to the Department of War, to the Department of the Navy, and to the Agricultural Department, for their liberal information as to engineering as applied to those various departments,

You will consider it rather strange that I should address you in the English tongue. I was in fact educated in the United States, but so long ago—forty-seven years, almost half a century—that I am quite at a disadvantage in so addressing you. You may wonder then, why I choose to use English rather than Spanish, in which latter tongue I would not be so hampered to find a proper vocabulary; it is simply because were I to use Spanish I would be understood by none, and therefore I have used English. One of my reasons for so doing is that for fifty years I have followed the great maxim of George Washington: "Do what is right, and fear no man." (Applause.)

CHAIRMAN HERMANY.—I call next upon Mr. B. Bachmetew, of the Polytechnic Institute of St. Petersburg, Russia, whom I take pleasure in now introducing.

MR. B. BACHMETEW.—Mr. Chairman, Ladies and Gentlemen: I feel greatly honored in appearing before you as the representative of Russia, and as my command of English is very limited, my remarks will be brief.

One fact, especially, I wish to impress upon you, and that is that it is subject for congratulation universally that the central idea which has inspired this Congress is so fully exemplified, and that we here see so fully illustrated the fact that the science of Engineering is growing more and more international in scope, and that engineering progress is developing more and more upon these international lines.

I further wish to convey to you from the Engineers of Russia a hearty greeting and best wishes. (Applause.)

CHAIRMAN HERMANY.—The next speaker who will address you is Mr. Otto F. Schoszberger, C. E., of the Imperial Technical High School of Vienna, Austria, whom I have the honor to now introduce.

MR. OTTO F. SCHOSZBERGER.—Mr. President, and Members of the International Engineering Congress: As a representative of the Engineers and Architects' Association of the Technical High School of Vienna, I bring to you hearty greetings from your foreign coworkers. I am rejoiced to participate in the deliberations of the International Congress of Engineering in St. Louis, under the auspices of the American Society of Civil Engineers, so grandly planned, organized and carried out in all its details. I find it to far exceed my anticipations.

CHAIRMAN HERMANY.—The Secretary will now make some important announcements.

SECRETARY HUNT.—I have just received the following cablegram:

"LONDON, October 3d, 1904.

"*Secretary Engineering Congress,*
WORLD'S EXPOSITION, ST. LOUIS, MO.

Greetings Junior Institution Engineers. Best wishes. Success.
"MOULTON, *President.*"

I wish, further, to announce that Colonel C. M. Watson, Commissioner-General for Great Britain, has issued the following invitation:

"The Commissioner-General for Great Britain and Mrs. Watson request the honor of the company of * * * at the British Royal Pavilion on Wednesday afternoon, October the fifth, 1904, from three to five o'clock, to meet the President and Members of the International Congress on Engineering."

I am requested by Colonel Watson to say that owing to the location of the building in the center of this Fair, it will be necessary for each member of the Congress, and each of the ladies who are to attend, to bring with them a card of introduction which will be issued. Those who have registered will a few hours later be able to receive those cards at the Secretary's office in this building. (Applause.)

I have the following letter:

"Mr. Chas. W. Hunt,
"*Secretary International Engineering Congress,*
"Hall of Congresses, World's Fair.

"Dear Sir: The Engineers' Club of St. Louis extends a very cordial invitation to the members of the Engineering Congress to attend a smoker, Friday evening, October 7th, at 8.30 o'clock, in the Missouri Building, World's Fair grounds.

"It is the hope of the Club that all the members of the Congress will find it convenient to be present that evening.

"Very truly yours,
"R. H. Fernald, *Secretary.*"

On this occasion it will not be necessary to have tickets; the badges of the members will admit them. Nothing is said about the ladies, so I presume that they are not expected.

I also have the following:

"St. Louis, Mo., Sept. 30, 1904.

"Chas. W. Hunt,
"*Secretary of the American Society of Civil Engineers,*
Hall of Congresses, World's Fair.

"Dear Sir: In behalf of the Local Committee of the American Institute of Mining Engineers, we gladly extend to your Society and other visiting engineers, the use and courtesies of our headquarters at Block 74, Mines and Metallurgy Building. All Engineers are welcome, and we will be glad to extend any courtesies within our power.

"Yours very truly,
"H. A. Wheeler.
"Local Sec'y."

Also the following:

"St. Louis, Mo., Oct. 1, 1904.

"Mr. Chas. Warren Hunt,
"*Sec'y American Society Civil Engineers,*
Administration Building, World's Fair.

"Dear Sir: The Goldschmidt Thermit Co. has offered to make special demonstrations for the members of the International Engineering Congress on such days and at such hour as may be most convenient. The Company demonstrates the application of melting and smelting steel by chemical reaction, and I believe it would interest a good many engineers to see this new process. Perhaps it would be well to have this demonstration given on two different days. They are executed in front of the metal pavilion near the Mines Building, and take fifteen to twenty minutes. I would suggest Tuesday and Friday afternoons, at 4.00 P. M., and would be pleased to hear from you, etc.

"Very truly yours,
"O. E. MOGENSEN."

Mr. Mogensen suggests Tuesday and Friday afternoon, at 4.00 P.M. I think we had better adopt these times, and if those members who are interested in the matter will be at the Metal Pavilion, near the Mines and Metallurgy Building, at 4 o'clock either to-morrow or Friday afternoon, they will be given this opportunity to witness the experiments named.

I am requested by the Canadian and Niagara Power Company to say that there are thirty copies of a little pamphlet which was given to the British Engineers on their way through Niagara, and which copies have been forwarded here for delivery by me to those members of that body who did not go on the train. They can be had by application at the office of the Secretary.

You all have copies of the programme, of course, so I do not think there is very much to call attention to there except, perhaps, to explain that it is the intention to carry out the programme as printed. If the discussion of any one of the subjects assigned for Tuesday is not finished it will not run over until the next day, but will be called up at the last meeting, which has been left open for the purpose.

The meetings of the Sections are shown on the bulletin-board, which gives the location of the various meeting-rooms, and it will not be at all difficult for you to find them. However, inquiry can be had at any time at the Secretary's office, which will be open at all times, and you will be directed properly.

Mr. President, Mr. Brooks, of Boston, wishes to say a few words.

FRED. BROOKS, M. AM. SOC. C. E.—Mr. President and Gentlemen: I wish to get a little information apropos of the fact that many of the members of this Congress are going home eastward, and to those who can make it convenient to stop in Boston, I would say that in Boston there is a large local Society, the Boston Society of Civil Engineers, in behalf of whose members I stand here to say that they wish to afford facilities for the members of this Congress to see what there is of interest in Boston. There is a great deal of interest in Boston. We assume that the world knows that to be a fact, but the information I desire in order to afford proper opportunities for showing any of them, is as to how many are to go, and when they will be there; and, as far as may be, what they particularly desire to see. A list will be opened in the Secretary's office after this adjournment, and those who have time to go to Boston will please make this known to the Secretary, and through him to me.

Secretary Hunt.—Before adjournment of this meeting of the Congress, I would like to make an announcement in connection with the Annual Convention of the American Society of Engineers.

The first meeting of that Convention will be held in this hall at 2.30 p. m., to-day, at which meeting the President, Mr. Hermany, will deliver the Annual Address.

At the close of the address of the President there will be a Business Meeting of the Society. I should like to say that all members of the Congress will be very cordially welcome at the meeting at which Mr. Hermany delivers his address.

Chairman Hermany.—Gentlemen, this first session of the International Congress of Engineers now stands adjourned until the final session to be held on Saturday at 10 a. m.

CLOSING SESSION.

October 8th, 1904, 10 A. M.

October 8th, 1904, 10 A. M.—Mr. Robert Moore, Past-President, Am. Soc. C. E., in the chair, Chas. Warren Hunt, Secretary.

The Chairman.—The meeting will please come to order. I am very sorry, as I am sure you all are, at the announcement that Mr. Hermany is indisposed and may not be able to be here this morning, although we are not wholly without hope. It has been thought best that the meeting should be called to order in his absence. I will, therefore, ask the Secretary for the next business.

The Secretary.—The Convention was to have a report from each of the sections of the Congress and I have one from Mr. Alfred Noble, Chairman of Section A, who is not able to be here this morning.

The report was read by the Secretary, as follows:

Report of the Chairman of Section A.

"I beg to submit the following concerning the work in Section A:

"The several subjects referred to this Section were treated in an able manner by the engineers assigned to prepare the papers. The present methods adopted in Harbor Development on Sea Coasts in the British Empire, in Holland and France were fully described, as well as the methods in use on the Sea Coast and on the Great Lakes of the United States. Much interesting discussion was elicited, both written and verbal. Two papers, treating specifically of the use of concrete blocks in Harbor Works, one general in character, the other referring to a specific case in Japan, were received too late to be printed for the use of the Congress.

"On the subject of Natural Waterways an excellent description was given of the methods successfully adopted for the rivers of Holland, and in the discussion a *résumé* was given of the experience gained in the improvement of the Channel of the Mississippi. A description of the so-called Rolling Dams was given and discussed at length, the discussion eliciting an interesting comparison of rolling and bear-trap dams.

"The subject of Artificial Waterways was treated with reference to three important Ship Canals of Holland, and the Inland Navigation System of France. A comprehensive paper on the general subject of Artificial Waterways was presented and special reference made to the Manchester Canal and suggested waterways across the Island of Great Britain. Typical canals and canalized rivers were also fully described in a paper relating specifically to those topics.

"The subject of the concurrent development of traffic on waterways and railroads was taken and examples cited to show that they were concurrent. This view was also supported in the discussions.

"The several papers on Dredges described comprehensively the various kinds found best adapted for different conditions on this continent, as well as in other countries. Tests of the capacity and efficiency of dredges, carried out in much detail, on the Mississippi elicited very full discussion.

"Under the head of Wharves and Piers the methods adopted in New York Harbor received adequate treatment in a descriptive paper and in the discussion which followed.

"The meetings of the Section were well attended. The papers and the discussions were on broad lines, and it is believed that the proceedings of the Section will constitute a valuable portion of the records of the Congress.

"Very respectfully,
"A. NOBLE."

THE CHAIRMAN.—Have you record of Section B? Is Mr. Croes, the Chairman of that section, present?

The Secretary reported, in the absence of Mr. Croes, Chairman of Section B, that four meetings were held of Section B, at which 8 papers were presented. There were also 11 discussions in writing and 38 Members participated in the oral discussion. The average attendance was 31.

Mr. Hermany, the Chairman of the Congress, arrived and took the chair.

THE CHAIRMAN.—We will now call for the report from the Committees of Section C.

MR. MOORE.—Mr. President, I have no written report on Section C, but I will say that we had three meetings, first on Railway Terminals, in which the very important question, and one which is pressing hard on all the trunk lines in all the great cities of railway and passenger terminals, was quite fully discussed. We had the general statistics presented by Mr. Corthell, and a paper by Mr. Foxlee, of London, describing the present practice in London and the proposed modifications at one of their great stations. Mr. Pontzen also described some of the most recent devices for handling passengers and baggage in the City of Paris.

The second discussion was on Underground Railways, a paper by Mr. Wm. Barclay Parsons, descriptive of the practice in New York and of the present elegant subway which is ready for use, another by Messrs. Basil Mott and David Hay, giving their views on the subject.

In the absence of Mr. Parsons we were obliged to discuss his paper without him.

The third topic for discussion was Live Loads for Railway Bridges, and that was fully discussed and some very important suggestions made. Then the Ventilation of Tunnels, which was presented in a paper by Mr. Charles S. Churchill, of the Norfolk and Western Railroad, and Mr. Francis Fox, of London, both of whom showed by actual example the entire feasibility of rendering even the longest tunnel perfectly safe and wholesome, and showed, also, by figures, the the great economy of operation accomplished by so doing. We were also fortunate on that day in having present Mr. Parsons, who gave an important and interesting account of some matters concerning the subway and also the ventilation of tunnels which was the subject proper for that time.

The meeting then adjourned *sine die.* This was earlier than some of the other Sections adjourned, but I think it might be expected that those who go by rail should arrive earlier than those who go by steamboat, canal or other antique method. I will say, however, that these meetings were well attended. The discussion was interesting and valuable, and I think the members of Section C will go back with the strong impression that the meeting was very well worth their coming here to attend and that it will very evidently impress remembrances.

The President.—The next report is from the Chairman of Section D, Mr. Stearns.

Mr. Stearns.—Ladies and gentlemen, I have not prepared any detailed report of the operations of this Section; in fact, it would be very difficult. It was so largely attended and there were so many discussions that it would be rather tiresome to enumerate them. The subject was Materials of Construction. On the first day, the papers on the manufacture of Steel and the Manufacture of Cement, were submitted and very thoroughly discussed. At the next meeting the discussion was on Concrete and Concrete-Steel, and it brought out a very thorough and complete discussion which could not be finished on that day. The third day we took all the Materials of Construction, including Steel, Cement and Wood. These also were fully discussed. Then on the fourth day we continued the discussion of Concrete and Concrete-Steel and that will develop a great deal of interest. These results in this section of the Congress will make valuable literature. When I first came to St. Louis I looked in the paper and in the funny column there was the story of a gentlemen who had seen on the programme that there were congresses at which there were men and women, that he had attended the congresses, and that he had found that the men with the brains were on "The Pike." That is not true of the engineers—

I don't mean that they are not men of brains—but it is not true that they were on "The Pike." I was surprised that with all the attractions there were at the Fair that there should be such an attendance at the Congress, and as there was at the section over which I presided, and, as I hear, by report, were at the other sections. It shows the interest of the engineers in their profession. Discussions were thoroughly valuable. They came from gentlemen who were prominent in the various lines, and, further than that, they were truly international. On every subject that was taken up we had very interesting discussions from men from the various nations who were well qualified to discuss the subject. It seems to me that those who organized this Congress and those who planned it so as to bring forth all these papers and discussions should be congratulated and worthy of great praise for the work they have done.

The President.—The next report is from Section E, Mr. H. S. Haines, Chairman, and the Secretary will read his report.

REPORT OF THE CHAIRMAN OF SECTION E.

"The papers presented in this Section were upon topics which attracted a considerable audience at each session and elicited interesting discussions, to which valuable contributions were made by engineers from England, Germany and Sweden.

"The topic of Pumping Machinery in connection with municipal water supply was discussed throughout one session and carried over to another. The papers upon recent locomotive practice were replete with information and contained some valuable suggestions as to the field for improvement.

"The papers upon Passenger Elevators and upon recent tests of Steam Turbines, in connection with the discussions upon them, represent the views of experts with reference to the prospective field for such devices that are based upon the most recent experience.

"The total results of the four days' sessions in this Section have been of a character to confirm the opinion that, for an International Congress to be of real utility, its discussions should be confined to a few live topics, presented in papers by leading experts and discussed in appropriate sections upon appointed days.

"H. S. Haines."

The President.—The next report is from Section F, Electrical, and the Secretary will read that report.

The Secretary.—The Chairman of this Section, Mr. Geo. H. Pegram, M. Am. Soc. C. E., was forced to leave before this time and did not have an opportunity to write a report. I can say, however, that in this section, while there were only three papers presented, they were on topics of great interest, and while the meetings of the Section were not very largely attended, there was an exceedingly good discussion by experts.

The President.—The next report is of Section G, Military and Naval, General William P. Craighill, Chairman.

General Craighill.—Mr. President, Ladies and Gentlemen: The subject of Section G was Military and Naval Engineering, and it was one not to lead us to expect a very large attendance, and in that our expectations were realized, but I wish to say that while we were not great in numbers, that the men of brain were there. Very few of the authors of papers were present, and we had many papers in our Section on all its subjects and it was truly an international Section, and we had papers not only from men of our own Society and civil engineers of the United States, but we also had several interesting papers from England, Japan, France and Russia, so that I think we may make claim that our Section was an international one. We regretted the absence of the gentlemen whose names you find upon this programme, especially Lieut.-Col. Holden, of the Royal Artillery of England, and also Admiral Endicott, from whom we expected a paper and whose presence we also expected, but he neither came nor gave us a paper, at which we were greatly disappointed.

The proceedings of the Section were opened by the consideration of the subjects of Fortifications and Ordinance. We had a very excellent paper on fortifications from one of our army engineers, Major Goethals, who could not be present, and there was no discussion. There was an excellent paper also on Ordnance read by Capt. Burr, of the Ordnance Department of the Army, who presented his paper and precipitated a very interesting discussion. The principal paper on Naval Architecture was by Sir William White, and there was also an admirable paper compiled at the University of Tokio, the authors of which were four of the professors of that institution. None of them was present, however, which we very much regretted.

On the subject of Marine Engineering, we had an admirable paper from Professor Durand, of Cornell University, and an exceedingly interesting one in French from M. Daymard, Engineer-in-Chief, of the Trans-Atlantic Company, of France. His paper was of exceeding interest.

Upon the subject of Lighthouses and Other Aids to Navigation, we had a number of printed papers, one by Lieut.-Col. Lockwood, Engineer Secretary of the Lighthouse Board, in Washington. We had also a paper from an English engineer, Mr. Thomas Matthews, of Trinity House, London, and also an interesting and instructive work from M. C. Ribière, Ingenieur en Chef des Ponts et Chaussées, Ingenieur en Chef du Service Central des Phares et Balises, France.

Upon the subject of Dry Docks, we had three papers, one from Mr. Cuthbert A. Brereton, of London, one from M. Paul Joly, of France, and another from Mr. Timonoff, of Russia. None of the authors of these papers was present. The discussion of all the papers was exceedingly interesting. It shows that the men who wrote them were men who knew what they were writing about. They presented their subjects in an interesting way, but in a way to give information bringing out the salient points for our consideration, and the discussion was most interesting, although indulged in by a few. As I said before, our numbers were not great. On the whole, I am sure the perusal of these papers will be interesting to civil engineers, as well as to naval engineers.

In conclusion, I wish to say that we were especially favored in this Section by having with us at every session, and during almost the whole of each session, a gentleman whose specialties brought him to us, and his presence was a source of great pleasure and profit to us. I refer to our distinguished confrère, that eminent engineer and most charming English gentleman, Sir William H. White. (Applause.)

The President.—The next Section H, was presided over by Mr. Chanute.

Mr. Chanute.—Gentlemen, it fell to my lot to preside over a rather miscellaneous section, and that illustrated very well the wide scope occupied by the American Society of Civil Engineers. The attendance was not large, varying from eighteen to twenty-seven members, but they were truly international. We had visitors, who took part in the discussion, from Great Britain, British Columbia, India, Switzerland, Sweden, Japan and one or two other countries which I cannot locate without the Secretary's notes. The papers were first on Irrigation. On that we had five papers and a number of written discussions on those papers, originating in France, Holland and Egypt, and covering an account of the present situation on the art which is becoming of greater and greater importance in the United States, and an account of what has been done in Java, Japan, the Hawaiian Islands and in India. The discussions were instructive, and will add considerably to the fund of knowledge on the subject. This took up the first day. The second day we had papers on Highway Construction, Foundations and Mining Engineering, which likewise created a very interesting discussion. On the third day we had papers on Engineering Education. In these we were favored with a number of accounts of what is being done in this country and abroad, and were favored with a most interesting talk from Sir William White. We also took up on that day Surveying, on which there was some discussion. The exact data will be furnished by the Secretary. In the course of our discussion it became apparent there were two points, not provided for as yet by the rules, which it was desirable to bring to the attention of the Convention and of the American Society of Civil Engineers. The first was in respect to the different methods that are adopted in the various countries for the measurement of irrigating water. In some countries the unit is the miner's inch and in some others it is acre-feet, and the meeting passed a resolution suggesting that the American Society of Civil Engineers should open communication with engineering societies in other parts of the world, in order to secure if possible some uniform system of measurement of irrigating water and the rules which are applicable to it. Again, it would seem that there were a great many things that might subsequently occur to the members in attendance which they might wish to express, and it was the desire of those meetings at which discussion of the various subjects brought up might be admitted before the final publication of the report of the Convention, and that the Secretary should announce some time beyond which no such written reports could be received. That, I believe, is substantially what was done by Section H.

The Chairman.—The Secretary of the Congress, Mr. Hunt, will now make a general report.

Secretary Hunt.—I think perhaps it is better, Mr. President, to answer Mr. Chanute's question at once, and to give notice that written discussions from engineers in America will be received up to the first of December, and not after that, for incorporation with the papers in the published proceedings of the Congress, and that all discussions received from the other side before the first of January, 1905, will be accepted for publication.

The programme as announced at the first meeting and issued to members of the Congress has been carried out, and after the first, or opening, meeting, the Congress divided into eight Sections.

There have been 28 meetings of these Sections, and the average attendance at each of these meetings was about 50.

In the discussion of the 38 selected subjects, 97 formal papers written by prominent engineers, by special invitation, were presented. Eighty-four of these papers were in type at the time of the opening of the Congress, and had already been distributed for the purpose of eliciting discussion.

In addition to these formal papers, 78 communications were presented to the Sectional meetings written by engineers who were unable to be present, and, in addition to this, there were 272 oral discussions at the meetings. All of the latter have been stenographically reported, and, after they have been submitted to each speaker for correction, will be collated and published, together with the papers, and issued to all members of the Congress.

The volume of the product of this Congress will be quite large. A fairly conservative estimate indicates that the proceedings of the Congress will cover some 3 500 pages of type, or 6 full volumes of the *Transactions* of the American Society of Civil Engineers.

The total membership of the Congress is between 3 400 and 3 500.

As to its International character it may be stated that in the formal papers presented, as well as in the 78 written communications before mentioned, 11 foreign countries are represented, and furnished about 50% of all papers received.

In this connection, an analysis of the total attendance at the Congress may be interesting. The total number of members and ladies of their families registered was 876, distributed as follows:

North America:			
Canada	9		
Cuba	4		
Mexico	4		
United States	724		
		741	
South America:			
Argentine	7		
Brazil	2		
Chile	1		
		10	
Europe:			
Austria	3		
Denmark	2		
France	4		
Finland	5		
Germany	9		
Holland	1		
England	70		
Ireland	1		
Scotland	2		
Hungary	3		
Europe (*continued*).			
Russia	3		
Sweden	6		
Switzerland	2		
		111	
Asia:			
India	5		
Japan	4		
Malay States	1		
		10	
Australasia:			
New South Wales	3		
Victoria	1		
		4	
			876

SUMMARY.

North America	741	
South America	10	
Europe	111	
Asia	10	
Australasia	4	
		876

There has been little time to prepare a detailed report of the work accomplished by the Congress, but, from what has been said by the Chairmen of the various Sections, and from the figures just given, it seems safe to presume that the result will be of such value to the Profession, both at home and abroad, that neither the American Society of Civil Engineers (which has inaugurated, financed, and carried it out) nor those engineers who, by contributing papers and discussions, or by their presence at the meetings, have made this result possible, will ever regret their participation.

PRESIDENT HERMANY.—The Congress will now have the privilege of listening to some remarks from our distinguished guest, Sir William H. White, Pres. Inst. C. E.

SIR WILLIAM H. WHITE.—Mr. President, Ladies and Gentleman: I think the words with which the Secretary concluded his general report err on the side of modesty, and that is the right kind of an error to make, especially when engineering is concerned.

I am to some extent an outsider in this matter, although I do not reckon myself an outsider where the American Society of Civil Engineers is concerned; but looking on as one who has had nothing whatever to do with the organization of this Congress, but who has very large experience in meetings, not merely in Great Britain, but of international character, there and elsewhere, I am happy to say, that neither in conception nor in conduct, nor in organization, nor in the character and scope of the papers printed and the subjects dealt with, and the standing of their authors, nor in the discussions, written and oral, which followed upon the reading of those papers has this Congress any need to fear comparison with any Engineering Congress that has ever been held.

In saying that, I have no intention to make compliments. I am stating that which I believe to be simply the truth, and I heartily congratulate the American Society of Civil Engineers and the Special Committee which undertook the organization of this Congress, and you, Sir, as President of the Congress (turning to President Hermany), for your conduct of its affairs, its meeting at the beginning and now at its close; and last, but not least, to the Secretary of the American Society of Civil Engineers (Applause), upon whom and upon whose staff has necessarily fallen the great burden of the work, both in preparation for, and in carrying out this great scheme. I do most heartily congratulate all concerned upon its unmixed and remarkable success.

I am sure that the volumes of your *Proceedings* when published will be of the greatest value to the Engineering Profession everywhere, and they will mark for all time the standing of the various branches of engineering in this year of 1904; and the fact that out of the total papers contributed about one-half have come from countries other than the United States, I think you will agree with me, will enhance the value of the *Proceedings;* for although it is perfectly true that the enormous extent of this great country and the many problems that it offers, problems of the greatest difficulty and variety, for solution by the engineer—that while the United States, as I say, necessarily shows up in bulk most largely in the proceedings of this Congress, yet you will all agree that in the rest of the world there ought to be found lessons of greatest value and works that are of enormous interest as suggesting to you American engineers possibilities of either varying or enlarging your practice, and which you will consider to be of use.

It is matter of great satisfaction to me, Sir, that on this occasion Great Britain, that is, I should say the British Empire, has been so well represented. In the classification which has been given by the Secretary, we have heard of those who came from England, and Scotland, and Ireland, and Australasia and India; but we know no such subdivision. The British Empire is one and indivisible. British subjects, wherever they live, are British; and, although there are these geographical distinctions, I ask you to consider that at this

Congress the British Empire has been represented in a way that I trust you will think worthy of that intimate connection which we have and always cherish with you on this side of the water. (Applause.)

At the beginning I spoke of the fact that the Institution of Civil Engineers had for the first time in its history made an outing and taken part officially in an International Congress. We did that, as I then said, in order to mark the high distinction in which our Institution holds the American Society of Civil Engineers. We could do no more.

I think I find myself to-day the sole survivor of the British Section of the Congress. I look about, and I think I see no other Englishman here—and we speak of Englishmen as representing the whole British Empire. I think I see no one here; but whether this be so or not, let me at the end say what I said at the beginning, that you have no truer friends and no more interested colleagues than those of us who come here to represent that old institution, the Institution of Civil Engineers. (Applause.)

I have been chiefly engaged under the friendly and kindly guidance of General Craighill in Section G. There seems to be a sort of fate that I should be in Section G. I have been President of Section G in the British Association, and now I find myself a private in this division here. But while my time has been chiefly spent there I have also appeared, as you have heard, in Sections D and H; and as far as my experience goes, there has been an equal interest in all the sections to that which we found to exist in Section G. In Section D we had when I was present a very keen but still friendly discussion on one of these burning subjects that concern the treatment of Steel. Then we passed to Timber and Cement, and I had nothing to say; but I was asked by one gentleman—I think he was concerned with the manufacture of cement—if we did not use large quantities in our ships. I told him we used bitu-mastic cement, when we used it, and we used as little as ever we could. We hope to come to the time when we will use none. I know that does not represent the future of cement in engineering generally, but it represents what we aim at in ship structures, for we want to carry as little as we can of anything that does not contribute to structural strength, and to arrange as best we can to secure protection and durability under these conditions.

Now, if I may say a word as a naval architect, I should say that we who have to build the floating structures that have to sustain stresses arising from conditions that it is impossible to forecast or accurately measure, we look at our brothers, the other civil engineers, who found their structures on the solid earth, with something like envy. If you gentlemen had to float some of the things that you build, they would be very different from what they are. (Laughter and Applause.) And when I look about, as I do often, and see what ample margins are quite reasonably provided, I sometimes wish that the density of sea water was greater than it was made to be.

And then I want to say a word about one allusion which my friend, Mr. Moore, made to modes of transit. It strikes me, you know, that he has perhaps made a claim that cannot be substantiated. He said that the reason they finished so quickly in his Section was that railways were the most rapid mode of transit. I believe that that correctly represents his statement. Now I am going to take exception to that. Do you know that ships are crossing the Atlantic at this date at as nearly as great an average speed as any train crosses the American Continent—and they are going uphill all the time? Not up and down, not with the engine having an easy time when going down a gradient – no, it is collar work all the time; and sometimes when I have been at sea and felt the tremor as the engine forced the vessel through the waves, it has seemed to me as if the ship was almost a sentient thing. Gentlemen, we are all apt to be proud of the particular work with which we are concerned, but I ask you to remember that, if things go well, in about two years there will be afloat upon the Atlantic, ships with which I am personally concerned which are to cross at a mean speed of twenty-nine statute miles per hour. (Applause.) So I say to Mr. Moore, do not let us take the down-hill rate of going, but let us consider the average, and while we admire all that can be done on railroads, do not let us think that transit by water is yet played out, for it is not.

Now, Ladies and Gentlemen, all good things come to an end. It is four weeks to-day since I landed in New York. It seems an age. I have done and seen such things as never before. I have made such multitudes of friends that really sometimes I am ashamed to say I do not recollect them all—not individually, you will understand, going from place to place, being everywhere received with kindness and with such generous hospitality, being treated in so princely a fashion; carried over enormous distances and shown great works in rapid succession; you will understand that one has only a sort of general impression remaining—a general impression of such kindness as can never be forgotten.

Well, my friends are gone—and I stand here alone. (Here Sir William showed evidences of emotion.) I want to say, we shall never forget this visit, we will never forget your kindness. (Applause.)

General Craighill, Past-President, Am. Soc. C. E. – Mr. Chairman, can I say just one word? I am sure that we will never forget Sir William White. (Applause.)

President Hermany: Gentlemen, we will continue our concluding proceedings by calling upon the foreign gentlemen who are members of this Congress to make such addresses on this occasion as they may feel inclined and moved by the occasion to do.

I cannot call them by name, but we will be glad to hear from any foreign member of the Congress who desires to address this assembly.

Mr. Karl P. Dahlstrom.*—Mr. President, Ladies and Gentlemen: During the holding of this International Congress, quite a number of countries have been represented at the general meetings, but as yet there is one country that has not been represented. We are here, a handful of engineers, from a country which has largely contributed to the development of this Louisiana Purchase Territory by sending hundreds and thousands of workers to toil and to break ground. I refer to Sweden. (Applause.)

We are not here as representatives of those workers. We are here representing the leading Swedish Society of Engineers, and we wish to thank the members of the American Society of Civil Engineers, and the Managers, for their kindness in extending an invitation to us.

We have attended the meetings with great interest, I assure you. It is to be regretted that no papers were presented to the Congress originally from our country, for our specialists, for reasons best known to themselves, have omitted to send any papers; but I can assure you that that is not due to any lack of interest on their part. Distance may have had something to do with it, as well as the fact that Sweden is located somewhat out of the way of the main thoroughfares of the commerce of the world; but engineering in Sweden is going on at a lively pace, equal to that in this country. We are developing our manufactures. Everybody knows the high quality of our iron and steel.

We are developing our railroads. We have extended our railroads through the northernmost parts of our country, and you can now travel from the south of Sweden away up to the Midnight Sun in Lapland, at a very comfortable rate.

We have in Sweden something that you have not anywhere else in the world; we have an institution that rewards inventors and scientists, regardless of their nationality, for their achievements for the benefit of mankind. I refer to the Institute Nobel.

As I say, I regret that Swedish experience has not been more largely represented at this Congress, but I hope that as the international work of these Congresses goes on there will be a more intimate intercourse between the Swedish and the American engineering societies. It has been suggested by previous Congresses that there should be formed an international engineering society, and there were people who worked very hard to bring this about, but I suppose the idea, like many bright ideas, was premature. It came too early. Yet it may be realized, and there may be other ideas realized before that, perhaps some international engineering journal, or something to that effect, that might bind the engineers of all nations together.

It may be that perhaps at some future time this International Engineering Congress may deem it expedient to convene in our beautiful capital in Sweden; and I assure you that if this should happen at any time, or before that time if any members of this American Society of Civil Engineers should find their way to Sweden and wish to study any of our engineering works, just call on your Secretary, Mr. Hunt, for our apdress in Stockholm, and I guess we will find means to put you straight and show you something, and you will be more than cordially welcome.

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* Royal Patent Office, Stockholm, Sweden.

President Hermany.—A representative from Switzerland is present. Will the gentleman have the kindness to address this meeting?

Mr. Francois Schule, Zurich, Switzerland.—As a member of the International Engineering Congress, I want to thank the American Society of Civil Engineers for organizing this Congress, and to state my belief that there has not been any other great technical congress organized without the support of the State and initiated by a private society such as this; and I must felicitate the Society, its President, and Secretary, for the complete success that has attended their efforts. This Congress will give to every engineer many new ideas with respect to the science of civil engineering. In conclusion, I can only add my tribute to that which was offered by Sir William White in his remarks this morning.

President Hermany.—Will the gentleman from Austria address the meeting?

Mr. O. F. Schonberger, Vienna, Austria.—Mr. Chairman, Ladies and Gentlemen: When I started from Europe to attend this meeting I expected to find a great many of the Austrian engineers at the Congress; but the time was not very convenient for them and therefore I have met only very few here. Since my arrival in America, during these few weeks, I have seen and learned so much and have enjoyed so much hospitality, and formed so many friendships, that I am sure that the Austrian engineers will greatly regret that they did not come in great numbers. In the name of the few who attended I thank the American Society of Civil Engineers for their hospitality, and I hope and believe that when your members come to Austria that the members of the Austrian Society of Engineers and Architects will extend to you the same reception that has been given us here, which has been most cordial and courteous.

President Hermany.—We will now hope to hear from Mr. Bachmetew, of Russia.

Mr. B. Bachmetew, St. Petersburg, Russia.—Mr. Chairman, Ladies and Gentlemen: In several minutes the Congress will be closed and the engineers from all the world who have convened here for about a week will go back to their respective countries. During the past week they have discussed many subjects of great engineering interests. They have not only looked ten years back, but as was well expressed by the chairman of the Mechanical Section, Mr. Haines, they have looked forward.

I am sure that these engineers of all countries who are going to return to their homes will take with them, not only that interest which has come to them as members of the Engineering Congress, but I am quite sure that they will take with them, and will express to their friends, the engineers of their own countries, a sense of the sincerity and great hospitality that they have received here from their American confrères, especially those represented by the American Society of Civil Engineers.

President Hermany.—May we now hear from the representative from Holland?

Mr. R. A. van Sandick.*—Mr. President, Ladies and Gentlemen: As I am the only representative from my country in attendance, I wish to speak a few words in testimony of the services that my country has rendered to the engineering profession in general; for instance, we made our dikes and effected our land reclamation even before America was discovered. Our irrigation and our reclamation societies are as old as the oldest communities in Europe, and that means that we have had an engineering experience of some centuries.

But now I am here in your country, and I have been received by the American engineers with a cordiality that I will never forget, and my only regret is that I have not been present at every session of this International Engineering Congress. The reason that I have not is because I have been admiring your railway system between California and St. Louis, having been detained by a wash-out that held us back four days. On that account it has required more time to make the trip from San Francisco to St. Louis than it would take to go from Holland to New York. (Laughter.)

I want to say that you have quite a different system of building railways in the West than prevails in the East. I believe that you make your railways as simple as is possible; and I think you ought to raise money from your railways, and from the money that you raise you ought to improve them. You have a business-like system of building railways, and the same kind of a business-like system in the building of dikes in California We, however, in Europe, do not look so much after the business part, at least we are not so money-making. We build our dikes for eternity. (Applause.) And in the same manner that we build our dikes, so we build our railways. I would advise you also to follow our example and to build also for eternity. For your country is new, but it will last for eternity, and therefore you should build your railways and engineering works for eternity.

What I saw in America, what I saw in California, what I have seen in this great World's Fair, and what I have seen of the American Society of Civil Engineers, I had never supposed existed in the world.

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* General Secretary of the Royal Institution of Netherlands, Engineers, The Hague, Holland.

When our engineers neglect to visit America I am sure that they know only a portion of the engineering business, and that a very small porion—a very small portion. (Applause.)

Now Ladies and Gentlemen, I want to say that when your people come over to Europe, when your engineers come to Europe, you go, of course, to Germany, you go to England, you go to France; and when you come to Holland you see only the old pictures, you see the evidence of the so-called Golden Century of our People; but I venture to say that we are not yet dead—we are still a live engineering people. (Applause.)

It is true that art is a fine thing, but industry and engineering business, I am proud to say, are alive in Holland, and for that reason when you come to Holland do not forget the Royal Institution of Netherlands Engineers, of which I am the Secretary-General. You can find at my office all sorts of things, and I can advise you, if you want to see very interesting things in a small country.

President Hermany.—We will be pleased to hear from Mr. T. Shima, of New York City, representing Japan.

Mr. T. Shima, New York City.—Mr. President, Ladies and Gentlemen: I have never before been so interested and pleased in attending such a big society of engineers from all parts of the world. I am the engineer of the government railways of Japan and am very much interested in American railroad methods. I have been nearly one year in this country studying along that line, and I have been at this meeting so interested and so happy as never before in my life.

You know my country is small, having only ten thousand square miles of area and it is also narrow.

The railway system is poor, but we have three parallel lines along the island. I think many of the engineers would be interested in visiting my country and inspecting our little system. We have dining cars, sleeping cars and just the same system as in America. We have docks and large harbors. We have water-works and other engineering works that would interest visitors. We are, now, as you know, under difficulties as great as at any time during the twenty-five hundred years since our foundation; but we are trying to push our railway engineering works as energetically as before our difficult war. I wish to express my best wishes for the future prosperity of the American Society of Civil Engineers.

President Hermany.—Our distinguished guest, Sir William White, desires to say a word of adieu. He will do it in his own admirable way.

Sir William H. White.—Ladies and Gentlemen, I must go now. I want to say good-bye. Perhaps in England I may meet many of you again. We did our best to welcome you before. This Congress proves that you valued our feeble attempt, and I hope that you will come again. So I say not "Good-bye," but "Au revoir."

President Hermany.—Are there other gentlemen present who desire to address the meeting? We have not heard from France. Is there not a gentleman from that country who desires to address us? (There was no response.)

President Hermany then continued:

"Ladies and Gentlemen, at the close of this session of the General International Engineering Congress, I would say that, judging from the character of the addresses we have listened to this morning, one might reasonably have some doubt as to whether this is an opening or a closing session. Judging from the extraordinary interest manifested and the number of persons present, the same interest is unmistakably evident now as upon the first morning of this week when we assembled here. I am constrained to say, after having looked into the countenances of the people then, and now again looking into your countenances, I see a depth of interest that bespeaks a devotion to the cause or profession of engineering that I may say is evidenced by not a single passive brain in this assembly.

There is not a countenance here that exhibits the slightest degree of inertness. This it has never been my privilege to have witnessed before, as I do upon this occasion, and as was manifest upon the first morning of our assembly.

In closing this Second International Congress held on American soil there remains but little to say. Much has been said to the point. The success—the eminent success, which it has attained is a matter for rejoicing and congratulation of us all.

It is perhaps a little bold to say it, but from my viewpoint and from my intercourse with members attending this Congress, I feel justified in saying. that when its work shall have been compiled and published it will establish the fact that the work accomplished here will not rank second to that of any preceding International Engineering Congress.

I, therefore, heartily congratulate you upon the work that has been done here. As was said in the opening address on Monday, the acquisition of the Louisiana Territory by peaceful diplomacy finds a most remarkable expression in this grand exposition, the centennial commemoration of that event—the grandest centennial the world has ever had.

The acquisition of this territory formed an epoch in our national history. Is it venturing too far to say that this International Engineering Congress will prove to be an epoch in American engineering?

It is now time to speak the final word. With kindest regrets and warmest friendship, with the greatest good will to you all, I now, in the name of the American Society of Civil Engineers, adjourn this General International Congress. (Applause.)

The assemblage was now about to disperse, but was invited to remain a few moments, by Secretary Hunt, in order to hear an announcement from Mr. Corthell.

Mr. E. L. Corthell.—Gentlemen, I asked the Secretary to do this, but he thought that I ought to make the explanation; at the request of the Chairman of the Board of United States Representatives to the International Navigation Congress, General Raymond, I wish to call your attention to the fact that next September, 1905, there will be held in Milan, Italy, an International Navigation Congress.

I have sent to every member of the American Society of Civil Engineers and also to about one hundred Associate Members the Propaganda, as we call it, of our Board. The Secretary of the Milan Congress has sent me from Milan about 200 of the programmes of that Congress in English, and if any member interested in that International Navigation Congress will write to me at No. 1 Nassau Street, New York City, I have about 150 of these programmes left, which I will be very glad to send to anyone.

Thereupon the International Engineering Congress adjourned *sine die.*

INTERNATIONAL ENGINEERING CONGRESS.

The following correspondence was presented to the Board of Direction of the American Society of Civil Engineers, November 1st, 1904, and is here printed by special order of the Board.

"International Engineering Congress,
"Committee in Charge.
"St. Louis, Mo., October 7th, 1904.

"Mr. Charles Warren Hunt,
"*Sec., Int. Engineering Congress.*

"My Dear Sir:—

"It is with great pleasure that I enclose a copy of the resolution this day unanimously adopted by the Committee in Charge, and I trust that I may be permitted to add, from my personal acquaintance with the matter, that it is to your unflagging zeal and executive ability that the acknowledged success of the International Engineering Congress is mainly due.

"Very sincerely yours,
"H. S. Haines,
"*Chairman.*"

"International Engineering Congress,
"Committee in Charge.
"St. Louis, Mo., October 7th, 1904.

"Mr. Charles Warren Hunt,
"*Sec., American Society of Civil Engineers.*

"Dear Sir:—

"At a meeting of the Committee in Charge of the International Engineering Congress held this day at the Administration Building, Louisiana Purchase Exposition, the following resolutions were unanimously adopted:

"*Resolved*, That it is the sense of the Committee in Charge of the International Engineering Congress that warm thanks should be given to our Secretary, Mr. Chas. Warren Hunt, for the successful outcome which is mainly due to his ability in the arrangement and execution of the manifold details of preparation for the Congress and for the unusual labor imposed by the performance of this important extra and special duty.

"*Resolved*, That a copy of this resolution be furnished to the Board of Direction of the American Society of Civil Engineers, with the hope that the membership of the Society in general may be appraised of the value of Mr. Hunt's services in this connection.

"Very truly yours,
"H. S. Haines,
"*Chairman.*"

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, December 7th, 1904.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "Probable Wind Pressure Involved in the Wreck of the High Bridge over the Mississippi River, on Smith Avenue, St. Paul, Minn., August 20th, 1904," by C. A. P. Turner, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, December 21st, 1904.—At this meeting a paper, entitled "The Reclamation of River Deltas," by J. Francis Le Baron, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

UNIVERSAL EXPOSITION, ST. LOUIS, 1904.

The Society has undertaken to provide for an engineering exhibit and the establishment of Headquarters for visiting engineers **in the center of the Liberal Arts Building,** and the Board of Direction has appropriated sufficient funds to defray the necessary expense.

This matter is in the hands of the following committee:

Robert Moore, M. Am. Soc. C. E., St. Louis, Mo., *Chairman.*
Edward C. Carter, M. Am. Soc. C. E., Chicago, Ill.
Mordecai T. Endicott, M. Am. Soc. C. E., Washington, D. C.
James L. Frazier, " " Frankfort, Ind.
William Jackson, " " Boston, Mass.
Emil Kuichling, " " New York, N. Y.
J. L. Van Ornum, " " St. Louis, Mo.
John F. Wallace, " " Chicago, Ill.
O. E. Mogensen, *Sec'y,* " " St. Louis, Mo.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The **Boston Society of Civil Engineers** will welcome any member of the American Society of Civil Engineers at its library and reading room, 517 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth

Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of the **St. Louis Engineers' Club,** in the business center of St. Louis, will be kept open during the World's Fair season, May 1st to December 1st, 1904, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of the **Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, first Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

October 12th to November 7th, 1904.

DONATIONS.*

BRITISH SEWAGE WORKS.

And Notes on the Sewage Farms of Paris and on Two German Works. By M. N. Baker. Cloth, 9 x 6 in., 146 pp. New York, The Engineering News Publishing Co., 1904. $2.

The introduction says: In the early history of American works for the treatment of sewage, *Engineering News* commissioned the writer to prepare a series of articles on "Sewage Purification in America." Some ten years having elapsed, during which many new, or at least modifications of old, methods had come to the front, particularly in Great Britain, the writer seized an opportunity, afforded by *Engineering News*, to visit representative British sewage works, and to meet leading British experts in sewage disposal. Twenty-four British sewage works were visited. They include examples of both old and new methods of treatment and of large and small works. Aside from five sewage farms and three chemical precipitation plants, the works combine two or more methods of treatment and are not easily classified. The readiest and perhaps the most reasonable basis of classification for the sixteen combined works appears to be the final method of treatment employed. Using this, we have eleven works with contact beds and five with percolating filters. The Contents of the book are: Part I, Works Employing Contact Beds for Final Treatment.—Part II, Works Employing Percolating Filters for Final Treatment.—Part III, Sewage Farms.—Part IV, Chemical Precipitation Works. Appendix I contains descriptions of German and French plants, and Appendix II, definitions and descriptions of sewage treatment for the convenience of any readers not familiar with the processes now in use. In the index the places are grouped alphabetically under the processes.

EARTH DAMS: A STUDY.

By Burr Bassell, M. Am. Soc. C. E. Cloth, 9 x 6 in., 70 pp. New York, Engineering News Publishing Company, 1904. $1. (Donated by the author.)

The author states that the literature upon the subject of earth dams is voluminous, but much of it is inaccessible and far from satisfactory. No attempt will be made here to collate this literature, or to give a history of the construction of earth dams; the object will rather be to present such a study as will make clear the application of the principles underlying the proper design and erection of this class of structures. Appendix II contains a bibliography on the subject; and there is an index of two pages.

UNTECHNICAL ADDRESSES ON TECHNICAL SUBJECTS.

By James Douglas. Cloth, 7 x 5 in., 84 pp. New York, John Wiley & Sons, 1904. $1.

These addresses, by a former President of the American Institute of Mining Engineers, were given on different occasions, such as the California meeting of the Institute, September, 1899; before the School of Mines and Metallurgy of the University of Missouri, May 30th, 1901; and before the Michigan College School of Mines, April 22d, 1904. In reprinting them, omissions are made occasionally to avoid repetition. In other cases, in order to bring the information up to date or to amplify the subject, considerable additions are interpolated; but these are enclosed in brackets. The Contents are: The Characteristics and Conditions of the Technical Progress of the Nineteenth Century; The Development of American Mining and Metallurgy, and the Equipments of a Training School; Wastes in Mining and Metallurgy.

CEMENTS, MORTARS AND CONCRETES: THEIR PHYSICAL PROPERTIES.

By Myron S. Falk, Jun. Am. Soc. C. E. Cloth, 9 x 6 in., 6 + 176 pp. New York, M. C. Clark, 1904. $2.50. (Donated by the author.)

The preface states that the purpose of this treatise has been to set forth as concisely as possible the physical properties of cement and cement mixtures, with principal reference to those properties which concern the engineer. The results of investigations made upon these materials have been examined with great care, and it has been the author's object to abstract, classify and summarize all the reliable data extant, filling in certain gaps with data of his own. The following headings outline, for the greater part, the scope of the work: General Physical Properties: Changes in Volume when Setting; Coefficient of Expansion Due to Temperature Changes; The Action of Sea Water and Salt; Porosity and Permeability; Effect of Freezing; Adhesion of Iron Rods to Cement Mixtures; Fatigue of Cement Mixtures; General Elastic Properties: Tensile and Compressive Properties; Coefficient of Elasticity; Elastic Limit; Ultimate Resistance; Flexure Properties; Coefficient of Elasticity; Modulus of Rupture; Shearing Resistance. A report of a special committee of the American Society of Civil Engineers on uniform tests of cement is given in Appendix I, and the Constitution of Portland Cement, by Clifford Richardson, in Appendix II. There is an index of subjects and one of authors, together covering six pages.

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* Unless otherwise specified, books in this list have been donated by the publishers.

THE FIELD PRACTICE OF RAILWAY LOCATION.

By Willard Beahan, M. Am. Soc. C. E. Cloth, 9 x 6 in., 252 pp. New York, Engineering News Publishing Company, 1904.

It is stated in the preface that the object of this book is to record the methods commonly used by American engineers in the West in the location of railroads built since the war. The writer is not aware of any similar book on this subject. The book is primarily for chiefs of party, for engineers obliged to make their first location, and for students. As much of economics, traffic, transportation, topography, geology and the locomotive is embraced as those who use it will probably have time to study or consider. This is a book for the instruction of the inexperienced in this kind of field work, and it is made as plain and as consecutive in the statement of practical routine as possible. No attempt has been made to exhaust the economic phases of the subject. In so far as it is possible, each chapter contains all the information needed for that part of the work. The economic units and the principles established by the late A. M. Wellington in his valuable book, "The Economic Theory of the Location of Railways," are here used and referred to by chapter and section in each case. There is an index of two pages.

REINFORCED CONCRETE.

Part I, Methods of Calculation. By A. W. Buel. Part II, Representative Structures. Part III, Methods of Construction. By C. S. Hill. Cloth, 9 x 6 in., 434 pp. New York, Engineering News Publishing Company, 1904. $5.00.

It is stated in the preface that in preparing this book the authors have had in mind a treatise for designing and constructing engineers following American practice and governed by the conditions which prevail in America. Theoretical discussions have been omitted, and in their place have been supplied practical working formulas, examples of representative structures, and records of actual practice in the selection of materials and of methods of workmanship and construction. For convenience of classification the book is divided into three parts or sections. In Part I are given working formulas for the calculation of all classes of structures in reinforced concrete and such facts about the properties of concrete and steel as are necessary in developing economical engineering designs. Part II contains illustrations and descriptions of a large number of representative structures of reinforced concrete. These record actual practice in design and show the adaptability of the new material to various types and forms of structures. Materials, workmanship and methods of construction are considered in Part III and are illustrated by numerous examples from actual practice. In this part especial attention is given to the construction of centers and forms for concrete work and to methods of facing and finishing exposed concrete surfaces. There is an index of six pages.

NOTES ON HYDROLOGY;

And the Application of its Laws to the Problems of Hydraulic Engineering. By Daniel W. Mead, M. Am. Soc. C. E. Cloth, 9 x 6 in., 202 pp. Chicago, 1904. (Donated by the author.)

These notes are intended by the author to form the basis for an introductory study of the fundamental phenomena of Hydrology, on which the applied science of Hydraulic Engineering should be based. The volume of literature covering many of the various branches of this subject is very great. Unfortunately, however, there is no single treatise which discusses the entire subject, and which can be utilized as a text-book, or reference book, to which the student may turn when investigating the various branches of this science. The lack of such a work is the reason for the preparation of these notes, which are intended to be used in connection with various publications to which references are given. The principles and laws of Hydrology must, of necessity, be based almost entirely on extended and long-continued observations, consequently the writer has utilized the observations available from a great many sources, and for long periods of time.

THE BUILDING ESTIMATOR.

By William Arthur. Cloth, 6 x 4 in., 150 pp. Omaha, Neb. (William Arthur), 1904. $1.50. (Donated by the author.)

The first part of the book gives approximate estimating for architects, engineers, etc., and methods showing how to obtain the value of buildings. Several pages of percentages are also given for residences, warehouses, stores and flats, schools, manufacturing and business buildings. The percentage of excavation, mason work, lumber, mill work, glass, carpenter labor, paint, hardware, tin. slate, plumbing, etc., is given under each class, and from six to twelve examples are used from actual bids put in or work done. There is a two-paged index.

CARBURATION ET COMBUSTION DANS LES MOTEURS A ALCOOL.

Par E Sorel. Paper, 9 x 5 in., 280 pp. Paris, Vve. Ch. Dunod, 1904. Paper, 8 francs; boards, 9 francs 50.

Much has been said for and against the using of alcohol in motors. Its partisans declare that it can be substituted for light forms of petroleum in any kind of a motor, without a disagreeable odor or smoke being perceptible. Its opponents accuse it of producing acids attacking the cylinders and suction-valves. The author says that these eulogies and reproaches are without foundation; all depends upon the circumstances of using and the manner of mingling the air and the combustible. In this new work the author aims to show the conditions that are necessary and sufficient.

ETUDE THEORIQUE ET PRATIQUE SUR LA VAPORISATION.

Méthode pour Augmenter Considérablement le Rendement des Générateurs à Vapeur. Par M. E. Wickersheimer. Paper, 10 x 6 in., 76 pp. Paris, Vve. Ch. Dunod, 1904. 3 francs 50.

The author has attempted, in this study, to show a new method for considerably increasing the efficiency of boilers. In this way he aims to economise a large proportion of the fuel without hurting the metal in the least with the heat and even preserving it from harm. The first part of the work consists in theoretical considerations and in laboratory practice: the second relates to industrial experience made in order to verify the Bez method.

ETUDE THEORIQUE DES ALLIAGES METALLIQUES.

Par Léon Guillet. Paper, 10 x 6 in., 232 pp. Paris, Vve. Ch. Eunod, 1904. 7 francs 50.

It is stated in the preface that recent researches on alloys have shown that their physical, chemical and mechanical properties depend upon the state in which the different metals entering into their composition are found. The author's aim is to study the different methods by which this knowledge is acquired; to show what has been already accomplished; and to write of the different alloys used in manufacturing. This volume is devoted essentially to theory; the author has repeated here the law on the phases of which the theory of alloys undoubtedly depend; in the following chapters he has studied all methods leading to the clearing up of metallurgical products. Each chapter has three divisions: 1st, the principle; 2d, the methods; 3d, the examples. The examples are taken from important work connected with the names of MM. Le Chatelier, Osmond and Hadfield.

ROCK EXCAVATION.

Methods and Cost. By Halbert Powers Gillette, M. Am. Soc. C. E. Cloth, 5 x 7 in., 8 + 376 pp. New York, M. C. Clark, 1904. $3.00 (Donated by the author.)

The author says that, while the scope of the book is wider than at first sight appears desirable, since it includes quarrying, open-cut excavation, trenching, subaqueous excavation, tunneling and under-ground excavation, still it should be remembered that the main elements of cost are of much the same quality, and that the differences are principally those of quantity. Thus it may require eight feet of drill hole per cubic yard of tunnel excavation as compared with half a foot for open cut work. The cost of drilling per cubic yard is obviously much greater in the tunnel than in the open cut, but the methods of drilling and the cost per foot of drill hole may be practically indentical. There is indeed much in common in all classes of rock excavation in spite of many detailed differences. The Chapter Headings are: Rocks and Their Properties; Methods and Cost of Hand Drilling; Machine Drills and Their Use; Steam and Compressed Air Plants; The Cost of Machine Drilling; Cost of Diamond Drilling; Explosives; Charging and Firing; Methods of Blasting; Cost of Loading and Transporting Rocks; Quarrying Stone; Open Cut Excavation; Methods and Costs on the Chicago Drainage Canal; Cost of Trenches and Subways; Subaqueous Excavation; Cost of Railway Tunnels; Cost of Drifting; Shaft Sinking and Stoping. The book contains an index of six pages.

Gifts have also been received from the following:

Am. Ry. Master Mechanics' Assoc. 1 bd. vol.
Atlanta & West Point R. R. Co. 2 pams.
Brit. Fire Prevention Comm. 1 pam.
Buffalo & Susquehanna R. R. Co. 1 pam.
Chicago, Burlington & Quincy R. R. Co. 1 pam.
Chicago, Rock Island & Pacific Ry. Co. 1 pam.
City Record. 6 bd. vol.
Cohen, Mendes. 67 pam.
Davis, J. 1 pam.
Dunod, Vve. Ch. 1 vol.
Eno, F. H. 1 vol.
Fisk, W. L. 1 pam.
Georgia Southern & Florida Ry. Co. 1 pam.
Gloucester, Mass.—City Council. 1 bd. vol.
Great Britain—Patent Office. 7 pam., 5 vol.
Great Northern Ry. Co. 1 pam.
Imperial Earthquake Investigation Comm. 1 pam.
Inst. of Civ. Engrs. 1 vol.
Inst. of Marine Engrs. 1 bd. vol.
Iowa Eng. Soc. 1 pam.
Königliche Technische Hochschule zu Danzig. 1 pam.
Louisville & Nashville R. R. Co. 1 pam.
McGill Univ. 1 bd. vol.
Madras, India—Pub. Works Dept. 1 pam.
Mass.—Statistics of Labor, Bureau of. 2 bd. vol.
Mead, D. W. 1 bd. vol.
Mich.—Health, Board of. 1 bd. vol.
Milwaukee—Board of Pub. Works. 1 vol.
Miss. Wire Glass Co. 1 bd. vol.
Montreal—City Council. 1 bd. vol.
New York—Dept. of Health. 3 bd. vol.
New York—State Engr. and Surv. 2 bd. vol.
New York Central & Hudson River R. R. Co. 1 pam.
Nichols. O. F. 1 pam.
North, E. P. 2 bd. vol.
North-East Coast Inst. Engrs. & Shipbuilders. 1 bd. vol.
Northern Pacific Ry. Co. 1 pam.
Queensland—Commr. for Rys. 1 vol.
Reading—Board of Water Commrs. 1 bd. vol.
Reading Co, 1 pam.
Ricketts. P. C. 1 vol.
Soc. Belge des Ingénieurs et des Industriels. 1 pam.
Soc. of Arts. 1 pam.
South Australia.—Rys. Commr. 1 pam.
Stanley Electric Mfg. Co. 1 map.
Toledo, St. Louis & Western R. R. Co. 1 pam.
Toronto—Provincial Board of Health. 1 pam.
Union Pacific R. R. Co. 1 pam.
U. S. Bureau of Forestry. 5 pam.
U. S. Bureau of Statistics. 1 vol.
U. S. Div. of Foreign Markets. 1 pam.
U. S. Navy Dept. 1 vol.
U. S. Office of Exper. Stations. 3 pams.
U. S. War Dept. 18 Specif.
U. S. Weather Bureau. 1 pam.
Univ. of Ill. 1 pam.
Wabash R. R. Co. 1 pam.
Victoria—Melbourne and Met. Board of Works Engr.-in-Chf. 1 pam.
Western Ry. of Ala. 1 pam.
Wis. Central Ry. Co. 1 pam.

BY PURCHASE.

A Text Book on Static Electricity. By Hobart Mason. New York, McGraw Publishing Company, 1904.

Refuse Disposal and Power Production. By W. Fancis Goodrich. New York, E. P. Dutton.

Scientific American Reference Book. Compiled by Albert A. Hopkins and A. Russell Bond. New York, Munn & Company, 1905.

SUMMARY OF ACCESSIONS.

October 12th to November 7th, 1904.

Donations (including 29 duplicates)	188
By purchase	3
Total	191

MEMBERSHIP.

ADDITIONS.

MEMBERS.		Date of Membership.
Almirall, Raymond Francis. Archt., 51 Chambers St., New York City		Oct. 5, 1904
Bishop, Hubert Keeney. Supt., Public Works, Hudson, N. Y.		Oct. 5, 1904
Blackwell, Francis Ogden. Cons. Engr., 49 Wall St., New York City		Oct. 5, 1904
Carter, William J. City Engr. (Res., 2042 Woodland Hills Ave.), Cleveland, Ohio	Jun. Assoc. M. M.	Feb. 5, 1895 Sept. 7, 1898 Nov. 1, 1904
Chamberlin, Chester Harvey. Div. Engr., Tex. & Pac. Ry., Boyce, La		Oct. 5, 1904
Chappell, Thomas Fenning. 45 Broadway, New York City		Oct. 5, 1904
Eastwood, John Thompson. First Asst. Engr., Sewerage, Sewerage and Water Board, 602 Carondelet St., New Orleans, La.	Jun. Assoc. M. M.	Mar. 6, 1894 Feb. 1, 1899 Sept. 6, 1904
Ford, William Griffing. 200 Montague St., Brooklyn, N. Y.		Oct. 5, 1904
Forgie, James. Chf. Asst. Engr., North River Div., P. R. R. Tunnels, 1 West 34th St., New York City		Oct. 5, 1904
Fort, Edwin John. Dept. of Highways, Municipal Bldg., Brooklyn, N. Y.	Assoc. M. M.	April 1, 1896 Nov. 1, 1904
Fyfe, James Lincoln. 1106 The Rookery, Chicago, Ill.		Oct. 5, 1904
Hanna John Hunter. Asst. Chf. Engr. and Supt., Capital Traction Co., 36th and M Sts., Washington, D. C.	Assoc. M. M.	April 3, 1901 Nov. 1, 1904
Hardy, Edward Dana. 3107 Eleventh St., N. W., Washington, D. C.		Oct. 5, 1904
Hasskarl, Joseph Frederick. Supt. of Constr., U. S. Engr. Dept. (Res., 1603 West Girard Ave.), Philadelphia, Pa.	Assoc. M. M.	Mar. 5, 1902 Nov. 1, 1904
Hohl, Leonhard John. Mgr., Cherokee Gold Dredging Co., Oroville, Butte Co., Cal.		Oct. 5, 1904
Hunt, Rufus Cameron. 718 St. Nicholas Ave., New York City		Oct. 5, 1904
Johnson, Lewis Jerome. Asst. Prof. of Civ. Eng., Harvard Univ., 309 Pierce Hall, Cambridge, Mass.	Assoc. M. M.	Sept. 4, 1901 Nov. 1, 1904
Kower, Hermann. Asst. Prof. of Drawing, Univ. of California, Berkeley, Cal.		Oct. 5, 1904
LaForge, Frederick William. Junior Engr., U. S. Engr. Dept., Ft. Terry, N. Y.		Oct. 5, 1904
Lang, Otto Heinrich. With Tex. & Pac. Ry. Co., Dallas, Tex.		Oct. 5, 1904
Larrabee, William Dominick. Supt. and Chf. Engr., Los Angeles Pacific R. R. Co., 316 West 4th St., Los Angeles, Cal.		Oct. 5, 1904

		Date of Membership.
Miller, Frank. Chf. Engr., Snare & Triest Co., 39 Cortlandt St., New York City		Oct. 5, 1904
Moir, Ernest William. Director, S. Pearson & Son, Ltd., 10 Victoria St., Westminster, S. W., London, England.		Sept. 7, 1904
Molera, Eusebius Joseph. 2025 Sacramento St., San Francisco, Cal.		Oct. 5, 1904
Neilson, George Harrison. Gen. Mgr., Braeburn Steel Co., Braeburn, Pa		Oct. 5, 1904
Pope, Willard. Vice-Pres. and Engr., Canadian Bridge Co., Ltd., Walkerville, Ont., Canada		Oct. 5, 1904
Reed, Wendell Monroe. Dist. Engr., U. S. Geological Survey, Reclamation Service, Roswell, N. Mex		Oct. 5, 1904
Ricketts, Louis Davidson. Globe, Ariz		Oct. 5, 1904
Sears, Walter Herbert. Div. Engr., Croton River Div., N. Y. Aqueduct Comm., Katonah, N. Y.		Oct. 5, 1904
Seurot, Paul Albert. Office Engr., North River Div., Penn., N. Y. & L. I. R. R. Co., 1 West 34th St., New York City.	Jun.	April 30, 1895
	Assoc. M.	Oct. 4, 1899
	M.	Nov. 1, 1904
Strickler, Gratz Brown. Gen. Supt., Richardson & Burgess, Inc., 613 Colorado Bldg., Washington, D. C.	Jun.	Jan. 5, 1897
	Assoc. M.	Jan. 4, 1899
	M.	Nov. 1, 1904
Talcott, Harry Randolph. Asst. Engr., Constr. Dept., B. & O. R. R. Co., Room 8, Walsh Bldg., Cumberland, Md.		Oct. 5, 1904
Teichman, Frank. Care, U. S. Geological Survey, Livingstone, Ariz		Oct. 5, 1904
Walker, James Wilson Grimes. Civ. Engr., U. S. N., Navy Yard, Charleston, S. C.		Oct. 5, 1904
Woodard, Silas H. Care, Penn., N. Y. & L. I. R. R., 345 East 33d St., New York City	Assoc. M.	Jan. 2, 1901
	M.	Nov. 1, 1904

ASSOCIATE MEMBERS.

Bamford, William Brokaw. Archt. and Civ. Engr., 1123 Broadway, New York City	Jun.	June 2, 1903
	Assoc. M.	Oct. 5, 1904
Bowler, Frank Colburn. Millinocket, Me.		Oct. 5, 1904
Brown, Stephen Pearson. Cons. Engr., Stratford, Conn.		Oct. 5, 1904
Carroll, Charles Joseph. Div. Engr., Mex. International R. R., Durango, Mexico		Oct. 5, 1904
Clark, Roscoe Nathaniel. 800 Main St., Hartford, Conn.		May 4, 1904
Hawxhurst, Robert, Jr. Chf. Engr., Kohala & Hilo Ry. Co., Hilo, Hawaii		Sept. 7, 1904
Johnston, John Parry. 822 Marquette Bldg., Chicago, Ill.	Assoc.	April 3, 1894
	Assoc. M.	Nov. 1, 1904
Kieffer, Stephen Ephraim. 2515 Dwight Way, Berkeley, Cal.		Oct. 5, 1904
Macdonald, Archibald Angus. 111 Fifth Ave., New York City	Jun.	June 4, 1901
	Assoc. M.	Oct. 5, 1904

		Date of Membership.
MACOMB, JOHN DE NAVARRE, Jr. 1407 Kentucky St., Lawrence, Kans.		Oct. 5, 1904
ROBB, LOUIS ADAMS. 71 Lincoln Park, Newark, N. J.	Jun. Assoc. M.	May 5, 1903 Oct. 5, 1904
RUNYON, WILLIAM KERPER. 111 Central Ave., Newark, N. J.	Jun. Assoc. M.	April 5, 1898 Oct. 5, 1904
SHERTZER, TYRRELL BRADBURY. Asst. Engr., Rapid Transit R. R. Comm., 621 West 152d St., New York City		Oct. 5, 1904
SMITH, CHESTER WASON. 23 Prospect St., Clinton, Mass.		Oct. 5, 1904
STRONG, JAMES BOORMAN. Engr., Ramapo Iron Works, Niagara Falls, N. Y.		Oct. 5, 1904
TAGGART, RALPH CONE. 104 West 128th St., New York City		Oct. 5, 1904
THORP, RICHARD FENWICK. Munaar, Madura Dist., South India		Oct. 5, 1904
TIERNAN, AUSTIN KING. Box 441, Salt Lake City, Utah		Oct. 5, 1904
WACHTER, CHARLES LUCAS. Constr. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City	Jun. Assoc. M.	June 3, 1903 Oct. 5, 1904

ASSOCIATES.

CAIRD, JAMES MORTON. 271 River St., Troy, N. Y.	Oct. 5, 1904

JUNIORS.

BRILLHART, JACOB HERBST. Box 42, Port Griffith, Luzerne Co., Pa.	Nov. 1, 1904
HUTCHINGS, JOHN BACON, Jr. 217 Waldron St., West Lafayette, Ind.	Sept. 6, 1904

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MEMBERS.

ALDRICH, TRUMAN HEMINWAY..........1739 P St., N. W., Washington, D. C.

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HORN, FRANK CHURCHILL.............Care, Hyde Park Hotel, 51st St., Boulevard and Lake Ave., Chicago, Ill.

JANNEY, WILLIAM DEAN..............Chf. Engr., The Elk River Coal & Lumber Assoc., and Buffalo & Ganley R. R., Clay, Clay Co., W. Va.

Juengst, Henry Frederick	Care, City Water Co., East St. Louis, Ill.
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Lea, Samuel Hill	Cons. Engr., Fort Meade, So. Dak.
Lippincott, Joseph Barlow	Superv. Engr., U. S. Reclamation Service, 1108 Braly Bldg., Los Angeles, Cal.
Miner, Charles Augustine	Petersburg, Va.
Moberly, Frank	Care, H. D. Lumsden, Chf. Engr., Transcontinental Ry., Ottawa, Ont., Canada.
Nicolls, William Jasper	Box 120, St. Davids, Pa.
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Pierce, William Thomas	12 Russell Ave., Watertown, Mass.
Prindle, Franklin Cogswell	Civ. Engr., U. S. N., Rear-Admiral (*Retired*), The Woodley, Washington, D. C.
Ripley, Henry Clay	Civ. and Cons. Engr. and Contr. for Constr., Aransas Pass Jetty, Galveston, Tex.
Safford, Edward Stanley	Civ. and Cons. Engr., 26 Cortlandt St., Room 215, New York City.
Simpson, George Frederic	Asst. Engr., Rapid Transit R. R. Comm., 318 West 135th St., New York City.
Thomas, Benjamin Franklin	Supt., Dam No. 37, Home City, Ohio.
Thomson, Thomas Kennard	Cons. Engr., Box 228, Havre de Grace, Md.
Warner, Edwin Hall	1209 Braly Bldg., Los Angeles, Cal.

ASSOCIATE MEMBERS.

Bliss, George Henry	Asst. Engr., U. S. Geological Survey, Reclamation Service, 10 Allen St., Newburyport, Mass.
Coleman, Henry Fitch	Treas., Indiana Northern Traction Co., 931 Real Estate Trust Bldg., Philadelphia, Pa.
Dimon, Daniel Young	With Westinghouse, Church, Kerr & Co., New York City (Res., 189 Jefferson Ave., Brooklyn, N. Y.)
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Hubbell, George Scott	352 West 117th St., New York City.
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Ketchum, Milo Smith	Prof. of Civ. Eng., Univ. of Colorado, Boulder, Colo.

Lackey, Oscar Francis...............Asst. Engr., Docks and Piers, Harbor Board, Baltimore, Md.

Lockwood, Willard Datus...........Res. Engr., Rochester Water Works, 19 Cambridge St., Rochester, N. Y.

MacNeille, Perry Robinson.........Cons. Engr., 1703 Railway Exchange, Chicago, Ill.

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Miles, John Wiley ....Cedar Hill, Tenn.

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Phillips, Theodore Clifford........4137 Langley Ave., Chicago, Ill.

Pressey, Henry Albert..............Civ. and Hydr. Engr., 408 Colorado Bldg., Washington, D. C.

Pritchett, Charles Marcellus......R. F. D., Cliff Cottage, Toney Creek, S. C.

Rockwell, James Vincent............Asst. Civ. Engr., U. S. N., U. S. Naval Station, San Juan, Porto Rico.

Schneider, Anton...................Care, Alphons Custodis Chimney Constr. Co., Pittsburg, Kans.

Shima, Takejiro.....................Care, Am. Bridge Co., Edge Moor, Del.

Spear, Walter Evans............ ...814 Banigan Bldg., Providence, R. I.

Swift, William Everett.............U. S. Reclamation Service, Chamber of Commerce Bldg., Denver, Colo.

Thompson, Mackey James ....901 Pioneer Press Bldg., St. Paul, Minn.

Tidd, Arthur Warren...............New York Aqueduct Comm., Pawling, N. Y.

Wilson, Percy Hartshorne...........Secy. and Treas., River & Harbor Impvt. Co., 501 Mariner & Merchant Bldg., Philadelphia, Pa.

ASSOCIATES.

Karner, William Josiah.............Res. Engr., Isthmian Canal Comm., Ancon, Canal Zone, Panama; Care, New York Post Office.

JUNIORS.

Boardman, Howard Edward. ....Care, P., N. Y. & L. I. R. R., 558 West 33d St., New York City.

Brisley, Edward Betts..............Crocker-Wheeler Co., 607 Empire Bldg., Pittsburg, Pa.

Foss, John Harrison ....Engr., Hamakua Ditch, Paia, Maui, Hawaii.

George, Hugh Melvin...............Laurel, Miss.

Higginson, Jonathan Yates..........Saugatuck, Conn.

Horton, Sandford...................54 West 129th St., New York City.

Miller, Stanley Alfred............Asst. Engr., S. Pearson & Son, Harbour Works, Coatzacoalcos, V. C., Mexico.

Plogsted, Walter John..............Care, Sanderson & Porter, 323 Baronne St., New Orleans, La.

Weller, Francis Repetti............Associated with Henry A. Pressey, Civ. and Hydr. Engr., 408 Colorado Bldg., Washington, D. C.

Whitney, Thomas Bryan, Jr............19 West 38th St., New York City.

Whitson, Abraham Underhill........Aspinwall, Pa.

DEATHS.

Bouscaren, Louis Frederic Gustave..Elected Member, April 7th, 1875; died November 6th, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(October 11th to November 5th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.

(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.

(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.

(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.

(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.

(6) *School of Mines Quarterly*, Columbia Univ., New York City, 50c.

(7) *Technology Quarterly*, Mass. Inst. Tech., Boston, Mass., 75c.

(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.

(9) *Engineering Magazine*, New York City, 25c.

(10) *Cassier's Magazine*, New York City, 25c.

(11) *Engineering* (London), W. H. Wiley, New York City, 25c.

(12) *The Engineer* (London), International News Co., New York City, 35c.

(13) *Engineering News*, New York City, 15c.

(14) *The Engineering Record*, New York City, 12c.

(15) *Railroad Gazette*, New York City, 10c.

(16) *Engineering and Mining Journal*, New York City, 15c.

(17) *Street Railway Journal*, New York City, 35c.

(18) *Railway and Engineering Review*, Chicago, Ill., 10c.

(19) *Scientific American Supplement*, New York City, 10c.

(20) *Iron Age*, New York City, 10c.

(21) *Railway Engineer*, London, England, 25c.

(22) *Iron and Coal Trades Review*, London, England, 25c.

(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.

(24) *American Gas Light Journal*, New York City, 10c.

(25) *American Engineer*, New York City, 20c.

(26) *Electrical Review*, London, England.

(27) *Electrical World and Engineer*, New York City, 10c.

(28) *Journal*, New England Water-Works Assoc., Boston, $1.

(29) *Journal*, Society of Arts, London, England, 15c.

(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.

(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.

(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.

(33) *Le Génie Civil*, Paris, France.

(34) *Portefeuille Économique des Machines*, Paris, France.

(35) *Nouvelles Annales de la Construction*, Paris, France.

(36) *La Revue Technique*, Paris, France.

(37) *Revue de Mécanique*, Paris, France.

(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.

(39) *Railway Master Mechanic*, Chicago, Ill., 10c.

(40) *Railway Age*, Chicago, Ill., 10c.

(41) *Modern Machinery*, Chicago, Ill., 10c.

(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.

(43) *Annales des Ponts et Chaussées*, Paris, France.

(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.

(45) *Mines and Minerals*, Scranton, Pa., 20c.

(46) *Scientific American*, New York City, 8c.

(47) *Mechanical Engineer*, Manchester, England.

(54) *Transactions*, Am. Soc. C. E., New York City, $5.

(55) *Transactions*, Am. Soc. M. E., New York City, $10.

(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.

(57) *Colliery Guardian*, London, England.

(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.

(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.

(60) *Municipal Engineering*, Indianapolis, Ind., 25c.

(61) *Proceedings*, Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.

(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.

(63) *Minutes of Proceedings*, Inst. C. E. London, England.

(64) *Power*, New York City, 20c

(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.

(66) *Journal of Gas Lighting*, London, England, 15c.

(67) *Cement and Engineering News*, Chicago, Ill., 25c.

(68) *Mining Journal*, London, England.

(69) *Mill Owners*, New York City, 10c.

(70) *Engineering Review*, New York City, 10c.

(71) *Journal*, Iron and Steel Inst., London, England

(72) *Street Railway Review*, Chicago, 30c.

(73) *Electrician*, London, England, 18c.

(74) *Transactions*, Inst. of Min. and Metal., London, England.

(75) *Proceedings*, Inst. of Mech. Engrs., London, England.

(76) *Brick*, Chicago, 10c.

(77) *Journal*, Inst. Elec. Engrs., London, England.

LIST OF ARTICLES.

Bridge.

Erection of the North-West Miramichi Bridge, Newcastle, N. B.* H. D. Bush. (5) v. 17, Pt. 1,

The Comparative Economy of Various Types of Highway Bridges. C. B. Wing. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.

Skew Bridge of Armoured Concrete.* (12) Oct. 7.

A Special Floor System for a Deck Bridge.* (14) Oct. 15.

The Ticonic Foot Bridge, Waterville, Me.* (14) Oct. 15.

A New Graphical Method for Stresses in Three-Hinged Arches.* J. W. Balet. (13) Oct. 20.

Travelers for Steel Spans. (Committee Rept. to the Assoc of Ry. Supts. of Bridges and Buildings.) (40) Oct. 21; (13) Oct. 27; (15) Oct. 28.

A Highway Bridge Floorbeam Connection.* (14) Oct. 22.

The Care of Railroad Trestles While Being Filled. (Committee Rept. to the Assoc. of Ry. Supts. of Bridges and Buildings.) (14) Oct. 22; (13) Oct. 27; (15) Oct. 28; Abstract (40) Oct. 21.

Forest Park Bridge of the Wabash at St. Louis.* A. O. Cunningham, M. Am. Soc. C. E. (15) Oct. 28; (14) Nov. 5.

Concrete Bridges on the St. Louis & San Francisco Ry.* (13) Nov. 3.

The Bellows Falls Highway Bridge.* (14) Nov. 5.

Construction Economique des Larges Ponts en Pierre: Deux Ponts Minces à Chaque Tête Portant un Plancher en Béton Armé: Ponts de Luxembourg et de Toulouse.* M. Séjourné. (38) Oct.

Pièces en Treillis Chargées de Bout, Brides Parallèles et non Parallèles. A. Vierendeel. (30) Oct.

Nouvelle Détermination Géométrique des Efforts dans les Poutres Droites à Travées Continues.* Farid Boulad. (33) Oct. 8.

Le Pont Suspendu Élisabeth, à Budapest.* A. Bidault des Chaumes. (33) Oct. 15.

Electrical.

A Modern Machine: The Direct Current Motor.* F. S. Keith. (5) v. 17, Pt. 1.

The Laying of the Commercial Pacific Cable. Frank P. Medina. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.

Localisation of Faults on Low-Tension Networks.* W. E. Groves, A. M. I. E. E. (77) Sept.

Some Properties of Alternators under Various Conditions of Load.* A. F. T. Atchison, Assoc. I. E. E. (77) Sept.

Eddy Currents in Solid and Laminated Masses.* M. B. Field, M. I. E. E. (77) Sept.

Armature Reactions in Alternators, with some Notes on the Running of Synchronous Motors.* H. W. Taylor. (77) Sept.

Alternating-Current Commutator Motors.* F. Creedy. (77) Sept.

The Telautograph.* James Dixon. (42) Oct.

The Distribution of Magnetic Induction in Multipolar Armatures.* W. M. Thornton. (26) Oct. 7.

Simultaneous Telegraphy and Telephony. Joseph Hollos. (Paper read before the International Elec. Cong.) (73) Oct. 7.

Effects of Continuous and Alternating Currents on the Dielectric Strength of Insulators.* G. W. O. Howe. (73) Oct. 7.

The Budapest Telephone Exchange.* (73) Oct. 7.

Design of Armature Coils.* (47) Oct. 8.

Electricity Supply in Willesden.* (73) Oct. 14.

A Recent Wireless Telegraph Patent.* (73) Oct. 14.

The Design of Induction Motors. A. Press. (26) Oct. 14.

Direct Current Transmission at 70 000 Volts.* A. Steens. (26) Oct. 14.

The Present Status of the Edison Storage Battery. A. E. Kennelly and S. E. Whiting. (Abstract of Paper read before the International Elec. Cong.) (73) Oct. 14.

Electrolytic Rectifiers: an Experimental Research. Albert Nodon. (73) Oct. 14.

Steam Turbine Power Plants: Notes on their Equipment and Operation.* J. R. Bibbins. (Paper read before the Amer. St. Ry. Assoc.) (17) Oct. 15; Abstract (13) Oct. 20.

The Problem of the Telephone Relay. John Trowbridge. (From *The Electrical Review*, of New York). (19) Oct. 15.

A Gas Power Plant for the Morecambe Bay Harbor Works.* (14) Oct. 15.

Interior Wiring for Telephones. Charles H. Coar. (27) Oct. 15.

Wireless Telegraphy in Russian Military Field Operations.* Frank C. Perkins. (27) Oct. 15.

The Conduction of Electricity in Mercury Vapour.* A. P. Wills. (From the *Physical Review*.) (73) Oct. 21.

Report on High-Voltage Transmission Lines.* (Committee Rept. to the N. Y. State St. Ry. Assoc.) (73) Oct. 21.

The Lead Voltameter. Anson G. Betts and Edward F. Kern. (Abstract of Paper read before the International Elec. Cong.) (73) Oct. 21.

Rotary Converters and Motor-Generator Sets. Wm. C. L. Eglin. (Abstract of Paper read before the International Elec. Cong.) (73) Oct. 21.

High-Tension Line Construction and Operation. F. A. C. Perrine, M. Am. Inst. E. E. (Abstract of Paper presented before the International Elec. Cong.) (47) Serial beginning Oct. 22.

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* Illustrated.

Electrical—(Continued).

The Water-Wheel Equipment in the Puget Sound Power Company's Plant.* George J. Henry, Jr. (27) Oct. 22.
The Western Electric Company's Exhibit, St. Louis.* (27) Oct. 22.
A French Municipal Electrical Plant.* (27) Oct. 22.
Three-Wire Distribution.* F. Hardie Jeannin. (27) Oct. 22.
On the Theory of the Matthews and the Russell-Léonard Photometers for the Measurement of Mean Spherical and Mean Hemispherical Intensities. Edward P. Hyde. (From *Bulletin* of the Bureau of Standards.) (27) Oct. 22.
Three New Electric Hoists.* (20) Oct. 27.
The Design of Generators for Electric Power Transmission Work.* David B. Rushmore, M. Am. Inst. E. E. (13) Oct. 27.
A Novel Armature Banding Lathe.* (17) Oct. 29.
The Siemens-Schuckert Continuous-Current Wattmeter.* Emile Guarini. (19) Oct. 29.
The Water Power Plants of the Northern California Power Co.* (14) Oct. 29.
Telpherage Plant for Handling Sand.* (27) Oct. 29.
Crane Equipment of the Missouri River Power Station, Kansas City, Mo.* (27) Oct. 29.
Single-Phase Commutator Motors.* Seijiro Sugiyama. (27) Oct. 29.
Resistance Boxes for Use in Precise Alternating Current Measurements. Geo. A. Campbell. (27) Oct. 29.
The Care of Storage Batteries. John Howatt. (64) Nov.
New Powerhouse, West Albany Shops: New York Central & Hudson River Railroad.* (25) Nov.; (64) Nov.
Electrical Progress in Canada. George Johnson. (10) Nov.
Power-House Location.* F. C. Harding. (64) Nov.
Multiple-Voltage Control of Motors.* Norman Gardner Meade. (64) Nov.
L'Énergie Hydro-Électrique, sa Production et ses Applications. Paul Lévy Salvador. (35) Serial beginning Oct.
Telphérage Électrique.* Émile Guarini. (36) Serial beginning Oct. 10.
Usine de la General Electric Company à Schenectady (États-Unis).* (33) Oct. 22.
La Force Motrice à l'Exposition de Saint-Louis: Installation des Machines Motrices.* L. Piaud. (33) Oct. 22.

Marine.

Messrs. Beardmore's New Shipyard and Engine Works.* (11) Oct. 7.
The Auxiliary Power Yacht *Mollihawk II.** (11) Oct. 7.
The Effect of Torpedo Explosions (on the *Sado Maru*).* (11) Oct. 7.
H. M. S. *Black Prince.** (12) Oct. 14.
Protection of Metallic Surfaces (on Vessels). H. Brandon. (Abstract of Paper read before the Inst. of Marine Engrs.) (12) Oct. 21.
Fast Turkish Protected Cruiser *Abdul Hamid.** (19) Oct. 29.
The Proposed 20 000-Ton American Battleships. (10) Nov.
Warships of the Great Powers, a Study of Relative Costs. Archibald S. Hurd. (10) Nov.

Mechanical.

Friction on Lubricated Surfaces.* Fred. A. McKay. (5) v. 17, Pt. 1.
The Practical Use of Extensometers.* K. M. Cameron. (5) v. 17, Pt. 1.
The Economy of Small Gas Engines Using Montreal Illuminating Gas.* Homer M. Jaquays. (5) v. 17, Pt. 1.
The Motion of Gases in Pipes, and the Use of Gauges to Determine the Delivery.* Richard Threlfall. (75) No. 2, 1904.
Mechanical Flight. J. Emery Harriman. (Paper read before the Boston Soc. of Civil Engrs.) (1) Aug.
Simple Steam Turbine Engines.* John Richards. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
Manufacture and Testing of Portland Cement. C. J. Wheeler. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
New Process for Utilizing Exhaust Steam. (From *Elektrotechnische Rundschau.*) (70) Oct.
A New System of Vacuum Return Line Exhaust Steam Circulation. James A. Donnelly. (Paper read before The Modern Science Club.) (70) Oct.
The Mt. Holly Brick and Clay Co., Harrisburg, Pa.* (76) Oct.
Air in Relation to Boiler-Feeds.* Jas. Alex. Smith. (Paper read before the Victorian Inst. of Engrs.) (11) Oct. 7.
The Wear of Machinery.* (11) Oct. 7.
Notes on the Manufacture of Coke. John Bell. (Abstract of Paper read before the British Soc. of Min. Students.) (22) Oct. 7.
Coal-Conveying Plant at a Manchester Power Station.* (12) Oct. 7.
Horse-Power Computation for Petrol Motors. C. C. Longridge, M. I. Mech. E. (12) Oct. 7.
Petroleum as Fuel. Boverton Redwood. (From Report of the Royal Commission on Coal Supplies.) (47) Oct. 8.
Variety in Steam Engines. (47) Serial beginning Oct. 8.
Mechanically-Made Cores. George H. Wadsworth. (Abstract of Paper read before the Amer. Foundrymen's Assoc.) (47) Oct. 8.
The New Foundry of the Hilles & Jones Company.* (20) Oct. 13.

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Mechanical—(Continued).

The Calorimetry of Exhaust Gases.* B. Hopkinson. (**62**) Oct. 13.
Gas, Oil and Steam for Power.* Michael Longridge. (Lecture before the British Assoc. of Mgrs. of Textile Works.) (**12**, Serial beginning Oct. 14; (**47**) Serial beginning Oct. 22.
White's Aerial Wire Ropeway.* (**11**) Oct. 14.
The Hardie-Thompson Water-Tube Boiler.* (**12**) Oct. 14.
Chimney Action. W. H. Booth. (**26**) Oct. 14.
Small Curtis Turbines. Richard H. Rice. (Abstract of Paper presented before the Amer. St. Ry. Assoc.) (**15**) Oct. 14.
Steam Turbine Power Plants: Notes on their Equipment and Operation.* J. R. Bibbins. (Paper read before the Amer. St. Ry. Assoc.) (**17**) Oct. 15; Abstract (**13**) Oct. 20.
Steam Turbines.* Richard H. Rice. (Paper read before the Amer. St. Ry. Assoc.) (**14**) Oct. 15; (**17**) Oct. 15; Abstract (**13**) Oct. 20.
High Speed Chain Driving. (**14**) Oct. 15.
A Pin-Plate and Rivet Diagram.* (**14**) Oct. 15.
Steam Turbines. (**27**) Oct. 15.
A Gas Power Plant for the Morecambe Bay Harbor Works.* (**14**) Oct. 15.
The American Diesel Engine.* E. D. Meier. (Paper read before the Amer. St. Ry. Assoc.) (**17**) Oct. 15; Abstract (**13**) Oct. 20.
Sherardizing: A New Process for Protecting Iron and Steel from Corrosion.* (**20**) Oct. 20.
Flue Gas Testing.* W. H. Whysall. (**72**) Oct. 20.
A Cable Power Scraper for Earth Excavation.* C. G. Newton. (**13**) Oct. 20.
High Pressure Steam Pipe Systems: Being a Review and a Comparison of Late Practice on the Continent of Europe and in America.* (**72**) Oct. 20.
Test of a Reeves Simple Engine.* (**72**) Oct. 20.
Suction Gas Producers.* (**62**) Oct. 20.
The Pyrodyen Steam Wagon.* (**12**) Oct. 21.
Brake Test of a 400-Kilowatt Westinghouse-Parsons Steam Turbine.* (**11**) Oct. 21.
Design of High-Speed Enclosed Steam Engines.* (**12**) Serial beginning Oct. 21.
Steam Hammers *vs.* Drop Hammers for Pile Drivers. Committee Repts. to the Assoc. of Ry. Supts. of Bridges and Buildings.) (**40**) Oct. 21; (**18**) Oct. 22; (**13**) Oct. 27; (**15**) Oct. 28.
The Future of the Steam Engine. G. F. Charnock. (Lecture before the Bradford Eng. Soc.) (**12**) Oct. 21; (**47**) Oct. 22.
Sewer Trenching and Gas Mains. E. G. Smithard. (Abstract of Paper read before the Eastern Counties Gas Managers' Assoc.) (**14**) Oct. 22.
Air in Relation to Boiler Feed. Jas. Alex. Smith. (Abstract of Paper read before the Victorian Inst. of Engrs.) (**14**) Oct. 22.
Distributing Power Throughout a Gas Works by Means of Electricity Generated at a Central Point. W. A. Baehr. (Paper read before the Amer. Gas Light Assoc.) (**24**) Oct. 24.
Concerning Tube Cleaners.* (From *The Locomotive.*) (**62**) Oct. 27.
Preparation of Alabama Coal for Coke Making. (Abstract of Paper read before the Eng. Assoc. of the South.) (**16**) Oct. 27.
The Huber Hydraulic Press at the World's Fair.* (**20**) Oct. 27.
Gasoline-Electric Passenger 'Bus.* (**17**) Oct. 29.
The Liquid Fuel Investigation of the Navy Department. (**14**) Oct. 29.
Staybolts. J. J. Ewing. (Paper read before the Richmond Railroad Club.) (**18**) Oct. 29.
Oxide Purification. E. H. Earnshaw. (Paper read before the Amer. Gas Light Assoc.) (**24**) Oct. 31.
The Generation of Steam by Waste Heat from Water Gas Sets.* Donald McDonald. (Paper read before the Amer. Gas Light Assoc.) (**24**) Oct. 31.
Utilization of the Waste Heat from Water Gas Sets for the Generation of Steam.* A. B. Macbeth. (Prepared for the Amer. Gas Light Assoc.) (**24**) Oct. 31.
The Gas Engines Which Did Not Come (to the Louisiana Purchase Exposition).* Peter Eyerman. (**64**) Nov.
Experiments with a Chamber for the Production of a Hot Working Fluid to be Used in the Generation of Power.* J. F. Wentworth. (**64**) Nov.
The Hamilton-Holzwarth Steam Turbine.* (**64**) Nov.
Compression in Gas Engines.* J. H. Massie. (**64**) Nov.
Piston Design.* J. F. Nagle. (**64**) Nov.
Notes on Oil Burners Using Compressed Air. A. P. Hume. (**64**) Nov.
Strength of Riveted Joints. (**64**) Nov.
Expansion Joints.* S. T. South. (**64**) Nov.
The Testing of Steam Engines.* H. Riall Sankey and C. Humphrey Wingfield. (**9**) Nov.
Modern Types of Plate Planing Machines.* Frank C. Perkins. (**41**) Nov.
Air Pumps.* W. H. Booth. (**64**) Nov.
The Adams-Farwell Gasoline Motor.* (**41**) Nov.; (**20**) Nov. 3.
Henry & Wright Sensitive Drills.* (**20**) Nov. 3.
The Putnam 32-Inch High Speed Lathe.* (**20**) Nov. 3.
Steam Turbines. Richard H. Rice. (Paper read before the Amer. St. Ry. Assoc.) (**62**) Nov. 3.
The Diesel Engine.* A. W. Oppenheimer. (From *Technics.*) (**19**) Nov. 5.
Electric Welding.* Emile Guarini. (**19**) Nov. 5.

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Mechanical—(Continued).

The Steam Turbine in Operation. (14) Nov. 5.
La Régulation des Turbines Hydrauliques.* M. L. Ribourt. (32) July.
Tubes sans Soudure.* M. L. Joubert. (32) July.
Appareils pour l'Épuration de la Vapeur et de son Eau de Condensation.* (37) Serial beginning Oct.
Banc à Étirer pour la Fabrication des Tubes en Fer Soudés à Rapprochement.* (34) Oct.
Note sur les Dispositifs des Joints Entre les Parties Fixes et Mobiles des Élévateurs pour Bateaux. (30) Oct.
Régulateur Automatique d'Alimentation des Chaudières à Vapeur, Système A. Lanne.* R. Michaux. (34) Oct.
Moteurs à Gaz Construits par la Société Française de Constructions Méchaniques. Ch. Dantin. (33) Oct. 8.

Metallurgical.

Ore-Handling Plant at the Clairton Works of the Crucible Steel Company.* Chas. H. Wright. (Paper read before the Civil Engineers' Club of Cleveland.) (1) Aug.
Surface Flow and the Hard and Soft State in Metals. (11) Oct. 7.
Ore Concentration Plant at the St. Louis Exhibition.* (11) Oct. 7.
The Rolling of Sections in Iron and Steel.* Adolph S. While. (20) Oct. 13.
Electric Furnace for Manufacturing Steel.* (47) Oct. 15.
The Manufacture of Steel Castings. W. A. Herron. (Abstract of Paper read before the Ry. Club of Pittsburg.) (47) Oct. 15.
Gayley Method for Extracting Moisture from Air for Furnace or Converter.* (62) Oct. 20.
The Chemistry and Metallurgy of Copper. Charles S. Palmer. (16) Serial beginning Oct. 20.
The Huntington-Heberlein Process.* Donald Clarke. (16) Oct. 20.
Ore Treatment at the Ivanhoe Mine, Kalgoorlie. H. J. Brooke. (16) Oct. 20.
A California Chlorination Plant.* (16) Oct. 20.
Modern Methods of Steel Casting.* Joseph Horner, A. M. I. Mech. E. (19) Serial beginning Oct. 22.
Chlorine in Metallurgy. James Swinburne. (Abstract of Paper read before the International Elec. Cong.) (47) Oct. 22.
Chlorination in Colorado.* William E. Greenawalt. (16) Oct. 27.
A New Ore-Testing Plant.* (16) Oct. 27.
The Bradford-Carmichael Process.* Donald Clark. (16) Nov. 3.
Evaporation of Solutions. (16) Nov. 3.
The Molecular Changes from Pig Iron to Steel. A. D. Elbers. (62) Nov. 3.
Propriétés, Classification et Utilisation des Aciers Spéciaux Ternaires.* M. L. Guillet. (32) July.

Military.

Transportable Wireless Telegraph Station for War Purposes.* (46) Oct. 15.
British Hydraulic Machinery: Its Use in the Manufacture of Munitions of War.* A. F. Petch. (10) Nov.

Mining.

The Industries of the Consolidated Lake Superior Company.* E. G. M. Cape. (5) v. 17, Pt. 1.
On the Methods of Working Coal in Saxony and Austria.* (22) Oct. 7.
Coal Winding Machinery.* Horace D. B. How. (From the *Transactions* of the South Wales Inst. of Engrs.) (57) Oct. 7.
Power Transmission by Compressed Air in Mines. R. W. Chapman. (Paper read before the Australian Inst. of Min. Engrs.) (47) Oct. 8.
Stamp Tappets.* M. P. Boss. (16) Oct. 13.
A Great Engineering Problem.* W. A. Lawson. (16) Oct. 13.
Electrically Driven Air Compressors (for Mining Purposes). (From *Bulletin 101*, pub. by Harron, Rickard & McCone.) (16) Oct. 13.
A Modern Method of Coal Washing C. A. Meissner. (Abstract from the *Journal* of the Mining Soc. of Nova Scotia.) (16) Oct. 13.
The Mines and Mineral Industries of Italy.* Enrico Bignami. (9) Nov.
The Tamarack Hoisting Engine.* (64) Nov.
Coal Working in Saxony.* (16) Nov. 3.
A Concrete-Lined Shaft for the U. S. Coal & Coke Co.* Francis Donaldson. (13) Nov. 3.
Visite de la Société des Ingénieurs Civils de France aux Mines d'Anzin.* Maurice Boutté. (32) Aug.
Notice sur la Compagnie des Mines de Houille de Marles (Pas-de-Calais).* M. E. Suisse. (32) Aug.
Les Nouveaux Evite-Molettes à l'Exposition d'Arras.* H. Schmerber. (33) Serial beginning Oct. 22.

Miscellaneous.

Engineering at Guy's Hospital. (12) Serial beginning Oct. 14.

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Municipal.

Losses in Underground Municipal Structures. A. Prescott Folwell. (Paper read before the Amer. Soc. of Mun. Improvements.) (14) Oct. 15; (60) Nov.
A Municipal Laboratory for Testing Asphalt and Cement. W. H. Broadhurst. (Paper read before the Amer. Soc. of Mun. Improvements.) (14) Oct. 15.
Street Lighting. A. S. Hatch. (Paper read before the International Assoc. of Mun. Electricians.) (24) Oct. 17.
A New English Telephonic Fire Alarm.* Frank C. Perkins. (46) Oct. 22.
The Time Required to Raise Steam for Fire Pumps from Cold Boilers and the Cost of Banked Fires.* (13) Nov. 3.
Some Road Building in the Philippines.* H. L. Stevens. (14) Nov. 5.
La Construction des Villes.* L. Cloquet. (31) Pt. 3, 1904.

Railroad.

The Kilanea Plantation Railway.* G. R. Ewart. (5) v. 13, Pt. 2.
Transition Curves. E. S. M. Lovelace. (5) v. 13, Pt. 2.
Railway Fencing. R. W. Leonard. (5) v. 17, Pt. 1.
Some Theories upon Railroad Location.* J. G. G. Kerry. (5) v. 17, Pt. 1.
Compound Locomotives in France.* Edouard Sauvage, M. I. Mech. E. (75) No. 2, 1904.
Vertical Railway Curves.* H. I. Randall. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
The Relative Merits of Large Grates and Heating Surfaces and Their Proportions.* (Abstract of Com. Rept. to the Amer. Ry. Master Mechanics' Assoc.) (61) Sept. 20.
Negative Work of Back Pressure and Compression.* Ira C. Hubbell. (61) Sept. 20.
Square Engine Houses: Terminal Railroad Association of St. Louis.* (39) Oct.; (18) Oct. 15.
Radial Staybolts for Oil Burning Engines.* I. C. Hicks. (39) Oct.
The Schenectady Super-Heater for Locomotive Practice.* (39) Oct.
Ten Wheel Passenger Locomotive with Wide Firebox Boiler: C. B. & Q. Lines West.* (39) Oct.
Painting Steel Cars, and Removing Cracked Varnish. (Reports of Committees and Papers read before the Master Car and Locomotive Painters' Assoc. of the U. S. and Canada.) (39) Oct.
What Is the Best Material and Treatment for Locomotive Front Ends? (Papers and Report of Committee read before the Master Car and Locomotive Painters' Assoc. of the U. S. and Canada.) (39) Oct.
Flange Wear and Side Bearing Trucks.* Gustav Lindenthal. (65) Oct.
Motor-Bogie for Electric Trains.* (11) Oct. 7.
Consolidation Engine. Tested at the St. Louis Exhibition.* H. W. Hanbury. (11) Oct. 7.
Motor Cars for Light Passenger Traffic on Steam Railways.* (13) Oct. 13.
Circuits for Manual Block Systems.* (Committee Rept. to the Ry. Signal Assoc.) (40) Oct. 14.
Track Depression of the Chicago & Northwestern Railway at Milwaukee.* (40) Oct. 14.
Notes on Equipment of the Wilkesbarre and Hazleton Railway.* Lewis B. Stillwell. (Abstract of Paper read before the International Elec. Cong.) (73) Oct. 14.
Express Passenger Engine, London and North-Western Railway.* (12) Oct. 14.
Electric Goods Locomotive.* (11) Oct. 14.
Western Union Railway of Australia.* (12) Oct. 14.
The Illmo Yards of the St. Louis Southwestern.* (15) Oct. 14.
The Stansstad-Engelberg Electric Railway.* (15) Oct. 14.
The St. Louis, Memphis & Southeastern Railroad.* (15) Oct. 14.
Pacific Type Locomotive, Southern Pacific.* (18) Oct. 15.
Economy in the Use of Steel Concrete (Through a Railroad Embankment). John B. Warren. (14) Oct. 15.
Standard Specifications for Mechanical Interlocking Material and Construction Work. (Committee Rept. to the Ry. Signal Assoc.) (18) Oct. 15; Abstract (13) Oct. 20.
The St. Louis, Kansas City & Colorado Railroad. Now the St. Louis Division of the Rock Island System.* J. L. Campbell, M. Am. Soc. C. E. (13) Serial beginning Oct. 20; (15) Oct. 21.
The Cole Balanced Compound Locomotive at the St. Louis Exhibition. H. W. Hanbury, A. M. Inst. C. E. (11) Oct. 21.
Freight and Roundhouse Doors and Fittings. (Committee Rept. to the Assoc. of Ry. Supts. of Bridges and Buildings.) (40) Oct. 21; (18) Oct. 22; (13) Oct. 27.
Railway Sleepers. (12) Oct. 21.
Cost of Concrete Structures. H. M. Jones. (Abstract of Paper presented to the Eng. Assoc. of the South.) (15) Oct. 21.
New Compound Locomotives in Bavaria.* Charles R. King. (15) Oct. 21.
Cost of Ditching Cuts and Widening Embankments.* (Abstract of Com. Rept. of the Roadmasters' and M. of W. Assoc.) (15) Oct. 21; (13) Oct. 27.
Three-Phase Alternating Current for Electric Railways. A. Zelewsky. (Abstract of Paper read before the International Elec. Cong.) (15) Oct. 21.
Preliminary Railroad Surveys by the Stadia Method.* J. A. MacDonald. (15) Oct. 21.
Turning Steel-Tired Car Wheels at the Readville Shops.* (40) Oct. 21.

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Railroad—(Continued).

Recent Improvements in Block Signals. C. H. Platt. (Abstract of Report No. 1 for Discussion before the International Ry. Cong.) (**40**) Oct. 21.

Delaware, Lackawanna & Western Locomotive and Car Repair Shops at Kingsland, N. J.* (**40**) Oct. 21.

Construction Difficulties on the Guayaquil & Quito Railway.* (**14**) Oct. 22.

Circuits for Manual Block Systems.* (Committee Rept. to the Railway Signal Assoc.) (**18**) Oct. 22; Abstract (**13**) Oct. 20.

Keyser Valley Shops, D. L. & W. R. R.* (**18**) Oct. 22; (**15**) Oct. 28.

Protecting Low Structures over Tracks from Locomotive Gases and Blasts. (Committee Rept. to the Assoc. of Ry. Supts. of Bridges and Buildings.) (**13**) Oct. 27; (**15**) Oct. 28; (**18**) Oct. 29.

Automatic Block Signals. M. Margot. (From *Bulletin* of the International Ry. Cong.) (**40**) Oct. 28.

Specifications for Air-Brake Hose.* M. H. Wickhorst. (Abstract of Paper read before the Amer. Soc. for Testing Materials.) (**15**) Oct. 28.

The Haberkorn Valve Mechanism for Locomotives.* (**15**) Oct. 28.

Passenger Locomotive with Vanderbilt Tender.* (**46**) Oct. 29.

The Use of Soda Ash in Locomotive Tanks. S. K. Dickerson. (Paper presented before the Central Railway Club.) (**18**) Oct. 29.

Cost of Concrete Construction on the Nashville, Chattanooga & St. Louis Ry. H. M. Jones. (Abstract of Paper read before the Engineering Assoc. of the South.) (**14**) Oct. 29.

The Works of the Locomotive & Machine Co. of Montreal.* (**14**) Oct. 29.

New Shops of the Pere Marquette R. R. at Grand Rapids, Mich.* (**18**) Serial beginning Oct. 29.

Oil Burning Consolidation Locomotive, Southern Pacific Co.* (**18**) Oct. 29.

Electric Locomotive Hoist, Atchison, Topeka and Santa Fe Railway.* (**25**) Nov.

Variable Speed Motors in Railway Machine Shops.* J. C. Steen. (**25**) Nov.

Painting of Steel Cars. (Committee Rept. to the Master Car and Locomotive Painters' Assoc.) (**25**) Nov.

Two Remarkably Efficient Wood-Working Tools, Grand Trunk Railway.* (**25**) Nov.

Roundhouse Cranes and Smoke Jacks.* (**25**) Nov.

The Building of a Chinese Railway.* Justin Burns. (**9**) Nov.

New Powerhouse, West Albany Shops: New York Central & Hudson River Railroad.* (**25**) Nov.; (**64**) Nov.

Powerful Prairie Type Passenger Locomotives: Lake Shore & Michigan Southern Railway.* (**25**) Nov.

Ball Bearing Center Plates and Side Bearings.* (**25**) Nov.

The Summers Gravity Dump Car.* (**25**) Nov.

Highest Development of Air Brakes, the High Speed Brake. (**25**) Nov.

The Washington Terminal Improvement: A General Description of the Union Station and the Elimination of Grade Crossings in Washington.* W. F. Strouse. (**13**) Nov. 3.

Great Northern Terminal Improvements at Seattle.* (**15**) Nov. 4.

The Young Valve and Gear for Locomotives.* (**15**) Nov. 4.

Train Resistance.* Chester A. Crandell. (**15**) Nov. 4.

The Railroad Cross-Tie Problem.* S. Whinery. (**15**) Serial beginning Nov. 4.

An Electric Freight Locomotive for the Philadelphia & Reading Railroad. (**17**) Nov. 5.

An All-Steel Car Framing.* (**17**) Nov. 5.

Energy Required in Watt-Hours when Braking with Air. Frank B. Rae. (**17**) Nov. 5.

The Use of Independent Motor Cars on Railways.* Philip Dawson. (**17**) Nov. 5.

Description d'une Cabine d'Enclenchements à Trajecteurs Pneumatiques à Basse Pression mise à l'Essai par la Compagnie du Nord, dans la Gare d'Ermont.* M. E. Despons. (**38**) Oct.

Rouleau Compresseur à Vapeur. (**34**) Oct.

Le Tunnel du Simplon. L. Faullain de Banville. (**36**) Oct. 10.

Tramway Électrique avec Mécanisme d'Adhérence à Roues Horizontales et Rail Central en Service à La Bourboule (Puy-de-Dôme).* A. Dumas. (**33**) Oct. 22.

Railroad, Street.

Notes on Solid Rail Joints. Percy S. Sheardown, A. M. I. E. E. (**77**) Sept.

Methods of Dealing with Mixed Systems of Traction. A. L. C. Fell. (Paper read before the Mun. Tramways Assoc. of Great Britain.) (**73**) Oct. 7; (**47**) Oct. 15.

New Swiss Electric Railway.* (From *Schweizerische Elektrotechnische Zeitschrift.*) (**73**) Oct. 7.

South Lancashire Tramways.* (**26**) Serial beginning Oct. 7.

Overhead Equipment: Notes on its Construction and Maintenance. J. M. McElroy. (Paper read before the Mun. Tramways Assoc.) (**73**) Oct. 7; Abstract (**26**) Oct. 7; (**47**) Oct. 15.

Cars: Their Equipment and Maintenance. John Aldworth. (Abstract of Paper read before the Mun. Tramways Assoc. of Great Britain.) (**47**) Oct. 8.

The Electric Railways of St. Louis.* (**17**) Oct. 8.

The Evolution of the (Street Railway) Industry.* (**17**) Oct. 8.

The New York Rapid Transit Subway.* (**17**) Oct. 8.

Power Plant of the Intramural Railway at the St. Louis Exhibition.* (**13**) Oct. 13.

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The Harlem River Tunnel Section of the New York Rapid Transit Railway.* (13) Oct. 13.
Worm Reduction in Electric Tramway Equipments.* O. F. Domon, M. I. E. E. (26) Oct. 14.
Sprague-General Electric Automatic Relay Train Control for Boston Elevated Railway.* G. H. Hill. (27) Oct. 15.
Steam-Turbine Power Plants.* (14) Oct. 15.
The Mono-Rail. F. B. Behr. (Abstract of Paper read before the International Cong. of Elec. Engrs.) (17) Oct. 15.
The Ideal Shop. W. D. Wright. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Oct. 15; (13) Oct. 20.
The Mandalay Electric Tramways.* (17) Oct. 15.
Wheel Matters.* J. Millar. (Paper read before the Amer. Ry. Mech. and Elec. Assoc.) (17) Oct. 15; Abstract (13) Oct. 20.
Solid Forged Steel Trucks.* (18) Oct. 15; (62) Nov. 3.
Exhibit of the Westinghouse Traction Brake Company at the World's Fair.* (18) Oct. 15.
Freight and Express Business of the Interurban Railway & Terminal Co. (72) Oct. 20.
The Determination of Schedules by Speed Templates.* Howard S. Knowlton. (72) Oct. 20.
Test Car of the Great Tramway Co. of Berlin.* (72) Oct. 20.
Some Single-Phase Railway Problems. Paul M. Lincoln. (Paper read before the International Elec. Cong.) (73) Oct. 21.
The Sot's Road Generating Station of the Underground Electric Railways Co. of London.* (73) Oct. 21.
Rolling Stock on the Leek and Manifold Light Railway.* (12) Oct. 21.
Power House of the New York Rapid Transit Subway.* (73) Serial beginning Oct. 21.
Single-Phase Electric Traction. Bion J. Arnold. (Abstract of Paper read before the International Elec. Cong.) (40) Oct. 21.
Rapid Transit Railway Construction in Brooklyn.* (14) Serial beginning Oct. 22.
The Territory, Construction, Power Transmission, System and Rolling Stock of the Oregon Water Power & Railway Company.* (17) Serial beginning Oct. 22.
The Work of the Electric Railway Test Commission.* Henry H. Norris. (17) Oct. 22.
A New Design of Snow Plow, Hartford Street Railway Company.* (17) Oct. 22.
The Effect of Changing the Gear Ratio on a Series Railway Motor Equipment.* J. C. Huffman. (17) Oct. 29.
Bitulithic Pavement in Street Railway Tracks.* (14) Oct. 29.
Opening of the New York Rapid Transit Subway.* (46) Oct. 29.
A New Design of Steel Motor Truck for Heavy Electric Traction Service.* (17) Oct. 29.
New Cars for Elevated Service, Boston Elevated Railroad.* (25) Nov.
Steam Motor Cars used on European Interurban Railways.* (17) Nov. 5.
A New Type of American Double-Deck Car.* (17) Nov. 5.
Changes in German Electric Railway Practice During the Past Year. (17) Nov. 5.
The Westinghouse Single Phase, A. C. Railway System for Interurban Service.* (17) Nov. 5.
High-Tension Trolley Insulators.* (17) Nov. 5.
La Traction par Courant Alternatif Simple, Système Winter-Eichberg.* (33) Oct. 8.

Sanitary.

The Reclamation of a Mountain Swamp.* Marsden Manson. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
The Heating of Suites of Rooms by Warm Water.* Alfred Luci. (From *Wärme und Heizung.*) (70) Oct.
Some Odd Types of Ventilating Fans.* (70) Oct.
Plumbing a Police Station.* (70) Oct.
The Royal Commission on Sewage Disposal. (12) Serial beginning Oct. 7.
A Concrete-Steel Sewer at Harrisburg, Pa.* (14) Oct. 15.
The Sewage Testing Station at Columbus, O.* John H. Gregory, Assoc. M. Am. Soc. C. E. (13) Oct. 20.
Scientific Disposition of Sewage. Charles F. Holder. (46) Oct. 22.
The Use of Sulphur for Sewer Pipe Joints in Wet Trenches. E. S. Rankin. (60) Nov.
The Pollution of the Passaic River and Its Prevention. Ernest Adam. (Paper read before the Amer. Soc. of Mun. Improvements.) (60) Nov.
Sewage Disposal for Small Cities and Towns. T. Chalkley Hatton. (Paper read before the Amer. Soc. of Mun. Improvements.) (60) Nov.
Sewage Disposal. J. N. McClintock. (Paper read before the Amer. Soc. of Mun. Improvements.) (60) Nov.
Some Experiments with Ventilating Fans.* D. W. Taylor. (13) Nov. 3.
The Disposal of Sewage Sludge at Saltley, England. (14) Nov. 5.

Structural.

The Measurement of Direct Strains in Tensile and Compressive Test-Pieces.* John Morrow. (75) No. 2, 1904.
Concrete-Steel.* M. C. Couchot. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.

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Structural—(Continued).

A New Method of Building Construction.* S. Giletti. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
Manufacture and Testing of Portland Cement. C. J. Wheeler. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
Paving Brick for Residences and Public Buildings.* (76) Oct.
The Classification of Iron and Steel. Albert Sauveur. (Paper read before the Amer. Soc. for Testing Materials.) (47) Oct. 8.
Comparative Cost of Wood and Steel Frame Factory Buildings.* H. G. Tyrrell. (15) Oct. 14.
A Difficult Concrete Pile Foundation.* (14) Oct. 15.
The Power Plant of the Columbian Cordage Company.* (14) Oct. 15.
Details of Concrete Piling at Washington Barracks, D. C.* (14) Oct. 15.
The Concrete Pile Foundation of the U. S. Express Co. Building, New York City. (13) Oct. 20.
Methods of Preserving Timber and Piles in Structures. (Committee Rept. to the Assoc. of Ry. Supts. of Bridges and Buildings.) (40) Oct. 21; (13) Oct. 27.
Testing Machines at the Boston Institute of Technology.* Day Allen Willey. (46) Oct. 22.
A New System of Concrete Piles.* W. P. Anderson. (14) Oct. 22.
A Long-Span Roof Truss and Suspended Floor.* (14) Oct. 22.
Magnetic Testing of Iron and Steel.* (Abstract of Committee Rept. to the Amer. Soc. for Testing Materials.) (27) Oct. 29.
Concrete Pile Foundations for a Power House at Dubuque.* (14) Oct. 29.
The New Building for the Cream of Wheat Company.* Howard S. Knowlton. (14) Oct. 29.
A Movable Sectional Theater Stage.* (14) Oct. 29.
The St. Louis Cement Exhibit: The Collective Portland Cement Exhibit and Model Testing Laboratory of the Association of Portland Cement Manufacturers.* (14) Oct. 29.
A Municipal Laboratory for Testing Asphalt and Cement.* W. H. Broadhurst. (Paper read before the Amer. Soc. of Mun. Improvements.) (60) Nov.
Special Steelwork in Orchestra Hall, Chicago.* (13) Nov. 3.
Experiments on the Weight of Crowds. (From *Centralblatt der Bauverwaltung.*) (13) Nov. 3.
Steel Details of a Large Dining Hall.* (14) Nov. 5.
The Master Car Builders' Drop-Testing Machine. (14) Nov. 5; (15) Nov. 4.
Nouvelle Détermination Géométrique des Efforts dans les Poutres Droites à Travées Continues.* Farid Boulad. (33) Oct. 8.
Essais de Matériaux à la Traction par Choc. (33) Oct. 15.

Topographical.

The Gradient-Telemeter Level and its Advantages on Preliminary Work.* R. W. Macintyre. (5) v. 17, Pt. 1.
Notes on Tacheometry: A Comparison of Systems.* Arthur L. Bell. (11) Oct. 21.

Water Supply.

An Estimate of the Discharge of the St. Francis River.* K. M. Cameron. (5) v. 17, Pt. 1.
The Flow of Streams.* R. S. Lea. (5) v. 17, Pt. 1.
Dam Construction and Failures During the Last Thirty Years. C. Baillairgé. (5) v. 17, Pt. 1.
Pipes and Joints for High Pressures. Franklin Riffle. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
The Jet Pump as an Hydraulic Apparatus.* F. G. Hesse. (Paper read before the Technical Soc. of the Pacific Coast.) (1) Sept.
Notes on the "Hardness" of Waters. Charles R. Walker. (7) Sept.
Permanent Standards in Water Analysis.* Lily Miller Kendall and Ellen H. Richards. (7) Sept.
Some Geologic Principles of Subterranean Water Supply. F. J. H. Merrill. (13) Oct. 20.
The Purification of Water. John M. Ordway. (62) Oct. 20.
The Water-Wheel Equipment in the Puget Sound Power Company's Plant.* George J. Henry, Jr. (27) Oct. 22.
The New Water-Works of East Orange, N. J.* (14) Oct. 22.
The Use of Copper Sulphate to Prevent Algal Growths at Hanover, N. H. Robert Fletcher, Assoc. Am. Soc. C. E. (13) Oct. 27.
Coagulation Plant at the Settling Basins at St. Louis, Mo. E. E. Wall. (13) Oct. 27.
The Animas Power Development in Colorado. (14) Oct. 29.
The Use of Soda Ash in Locomotive Tanks. S. K. Dickerson. (Paper presented before the Central Railway Club.) (18) Oct. 29.
The Water Power Plants of the Northern California Power Co.* (14) Oct. 29.
A Favorable Opinion on Copper Sulphate for Treating Water. Daniel D. Jackson. (Abstract of Paper read before the Amer. Chem. Soc.) (14) Oct. 29.
The Nottingham Water Works Pumping Engine.* (64) Nov.
The Pollution of the Passaic River and Its Prevention. Ernest Adam. (Paper read before the Amer. Soc. of Mun. Improvements.) (60) Nov.
Thawing Out Frozen Water Pipes Electrically.* William Maver, Jr. (10) Nov.
Cataract Dam for the Additional Water Supply of Sydney, N. S. W.* (14) Nov. 5.

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* Illustrated.

Water Supply—(Continued).

The Roofing of the Washington Filter.* E. D. Hardy, M. Am. Soc. C. E. (**14**) Nov. 5.
L'Energie Hydro-Electrique, sa Production et ses Applications. Paul Lévy Salvador. (**35**) Serial beginning Oct.

Waterways.

Tide Levels and Datum Planes in Eastern Canada. W. Bell Dawson, Assoc. M. Inst. C. E. (**5**) v. 17, Pt. 1.
Hydraulic Dredge *King Edward VII.** A. W. Robinson. (**5**) v. 17, Pt. 1.
The Montreal, Ottawa and Georgian Bay Navigation.* G. H. Blanchet. (**5**) v. 17, Pt. 1.
Observations on Driving Piles with a Steam Hammer. J. J. Welsh. (Paper read before the Technical Soc. of the Pacific Coast.) (**1**) Sept.
A Great Engineering Problem.* W. A. Lawson. (**16**) Oct. 13.
The Cost of Quarrying Rubble and Dimension Stone for the Buffalo, N. Y., Stone Breakwater.* Emile Low, M. Am. Soc. C. E. (**13**) Oct. 20.
New Graving Dock at Hebburn.* (**12**) Oct. 21.
Conservancy of the Huangpu or Shanghai River. (**29**) Oct. 21.
The Design of a Dry-Dock. Alfred W. Young. (Abstract of Paper read before the Junior Inst. of Engrs.) (**14**) Oct. 22.
The Drainage of Inner Basins, Mississippi Levee System.* Chas. Le Vasseur. (From *Journal* of the Memphis Engineers' Soc.) (**13**) Oct. 27.
Proposed Canal to Connect Montreal with the Head of Lake Huron.* Day Allen Willey. (**19**) Oct. 29.
De l'Influence des Digues Projetées à l'Embouchure de la Neva contre les Inondations Maritimes de Saint-Pétersbourg. W. Czarnomski. (**31**) Pt. 3, 1904.
La Nouvelle Entrée du Port de Saint-Nazaire.* Léon Griveaud. (**35**) Oct.
Note sur les Dispositifs des Joints entre les Parties Fixes et Mobiles des Élévateurs pour Bateaux. (**30**) Oct.
Port de Zeebrugge, les Flotteurs d'Allègement des Caissons d'Infrastructure du Môle.* Ch. Piens. (**30**) Oct.

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* Illustrated.

PROCEEDINGS

OF THE

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

(INSTITUTED 1852.)

VOL. XXX. No. 10.

DECEMBER, 1904.

Edited by the Secretary, under the direction of the Committee on Publications.

Reprints from this publication, which is copyrighted, may be made on condition that the full title of Paper, name of Author, page reference, and date of presentation to the Society, are given.

CONTENTS.

Society Affairs......................Pages 487 to 517.
Papers and Discussions...........Pages 863 to 934.

NEW YORK 1904.

Entered according to Act of Congress, by the American Society of Civil Engineers in the office of the Librarian of Congress, at Washington.

American Society of Civil Engineers.

OFFICERS FOR 1904.

President, CHARLES HERMANY.

Vice-Presidents.

Term expires January, 1905:	*Term expires January, 1906:*
JAMES D. SCHUYLER.	F. S. CURTIS,
	S. L. F. DEYO.

Secretary, CHARLES WARREN HUNT.

Treasurer, JOSEPH M. KNAP.

Directors.

Term expires January, 1905:	*Term expires January, 1906:*	*Term expires January, 1907:*
RICHARD S. BUCK,	ALFRED CRAVEN,	CHARLES S. GOWEN,
GEORGE H. PEGRAM,	JOSEPH O. OSGOOD,	NELSON P. LEWIS,
WILLIAM J. WILGUS,	GEORGE S. DAVISON,	JOHN W. ELLIS,
WILLIAM JACKSON,	E. C. LEWIS,	GEORGE S. WEBSTER,
EDMUND F. VAN HOESEN,	HUNTER McDONALD.	RALPH MODJESKI,
JAMES L. FRAZIER.	ELWOOD MEAD.	CHARLES D. MARX.

Assistant Secretary, T. J. McMINN.

Standing Committees.

The President of the Society is *ex-officio* Member of all Committees.

On Finance:	*On Publications:*	*On Library:*
S. L. F. DEYO,	GEORGE H. PEGRAM,	NELSON P. LEWIS,
L. F. G. BOUSCAREN,	ALFRED CRAVEN,	WILLIAM JACKSON,
RICHARD S. BUCK,	JOSEPH O. OSGOOD,	E. C. LEWIS,
WILLIAM J. WILGUS,	GEORGE S. DAVISON,	RALPH MODJESKI,
CHARLES S. GOWEN.	HUNTER McDONALD.	CHARLES WARREN HUNT.

Special Committees.

On Uniform Tests of Cement:—George S. Webster, Richard L. Humphrey, George F. Swain, Alfred Noble, Louis C. Sabin, S. B. Newberry, Clifford Richardson, W. B. W. Howe, F. H. Lewis.

On Rail Sections:—L. F. G. Bouscaren, C. W. Buchholz, S. M. Felton, Robert W. Hunt, John D. Isaacs, Richard Montfort, H. G. Prout, Joseph T. Richards, Percival Roberts, Jr., George E. Thackray, Edmund K. Turner, William R. Webster.

On Concrete and Steel-Concrete:—C. C. Schneider, J. E. Greiner, W. K. Hatt, Olaf Hoff, Robert W. Lesley, J. W. Schaub, Emil Swensson, A. N. Talbot, J. R. Worcester.

◆

The House of the Society is open from 9 A.M. to 10 P.M. every day, except Sundays Fourth of July, Thanksgiving Day and Christmas Day.

House of the Society—220 West Fifty-seventh Street, New York.

Telephone Number, - - 533 Columbus.
Cable Address, - - - - "Ceas, New York."

Vol. XXX. DECEMBER, 1904. No. 10.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

INSTITUTED 1852.

PROCEEDINGS.

This Society is not responsible, as a body, for the facts and opinions advanced in any of its publications.

SOCIETY AFFAIRS.

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MINUTES OF MEETINGS.

OF THE SOCIETY.

December 7th, 1904.—The meeting was called to order at 8.40 P. M., Rudolph Hering, M. Am. Soc. C. E., in the chair; Chas. Warren Hunt, Secretary; and present, also, 107 members and 24 guests.

The minutes of the meetings of November 2d and 16th, 1904, were approved as printed in the *Proceedings* for November, 1904.

A paper entitled "Probable Wind Pressure Involved in the Wreck of the High Bridge over the Mississippi River, on Smith Avenue, St. Paul, Minn., August 20th, 1904," by C. A. P. Turner, M. Am. Soc. C. E., was presented by the Secretary, who also read a communication on the subject by Theodore Cooper, M. Am. Soc. C. E. The paper was then discussed orally by Messrs. G. E. Gifford, H. W. Brinckerhoff, N. A. Melick, S. Bent Russell, H. F. Dunham, R. A. MacGregor, H. C. Keith, S. T. Wagner and H. P. Macdonald.

The Secretary presented a letter from the American Association for the Advancement of Science, inviting members of the Society to attend the meetings of the Association to be held in Philadelphia at the University of Pennsylvania, December 27th to 30th, 1904.

Ballots for membership were canvassed, and the following candidates elected:

As Members.

William Eugene Austin, New York City.
Job Rockfield Furman, New York City.
William Montgomery Gardner, Memphis, Tenn.
James Noble Hatch, Chicago, Ill.
Emil Louis Nuebling, Reading, Pa.
Richard Harvey Phillips, St. Louis, Mo.
John Horton Pope, New York City.
Harold Ulmer Wallace, Chicago, Ill.
Edgar True Wheeler, Los Angeles, Cal.

As Associate Members.

Fred Asa Barnes, Ithaca, N. Y.
William Hunt Bowne, Glen Cove, N. Y.
Varnum Pierce Curtis, Worcester, Mass.
John Jerome Dalton, Asheville, N. C.
Samuel Edwards Fairchild, Jr., Philadelphia, Pa.
Arthur James Griffin, Brooklyn, N. Y.
Henry Atkinson Holdrege, Omaha, Nebr.
Joseph Prosper Horstman, Parkersburg, W. Va.
Robert Elmer Horton, Utica, N. Y.
George Danforth Huntington, Watertown, N. Y.
Ivar Kreuger, Johnnesburg, South Africa.
George Latimore Lucas, Trenton, N. J.
Ira Welch McConnell, Montrose, Colo.
George Alexander Hutchings Mould, Johannesburg, South Africa.
Herbert Damon Newell, Ontario, Ore.
George Frederick Folger Osborne, Bombay, India.
George Bigelow Pillsbury, Washington, D. C.
Marshall Rogers Pugh, Philadelphia, Pa.
Hugo Julius Scheuermann, Albany, N. Y.
Harry Linden Shaner, Lynchburg, Va.
Herman Franklin Tucker, Kendal Green, Mass.
Willis Tubbs Turner, Salt Lake City, Utah.

Frank George White, Salt Lake City, Utah.
Joseph Wright, Sheffield, Ill.
George Washington Zorn, Cheyenne, Wyo.

As Associates.

Theodore Martin May, New York City.
Vincent Ignatius Stephen, Monywa, Upper Burma, India.

The Secretary announced:

The transfer of the following candidates, by the Board of Direction, on December 6th, 1904:

From Associate Member to Member.

Edwin Stanton Fickes, Pittsburg, Pa.
Sifroy Joseph Fortin, City of Mexico, Mexico.
Arthur Willard French, Worcester, Mass.
John Clark Spencer, Pittsburg, Pa.
Everett Broomall Wilson, Evanston, Ill.

The election of the following candidates, by the Board of Direction, on December 6th, 1904:

As Juniors.

Edward Cartwright Constance, St. Louis, Mo.
Harry Johnson Deutschbein, Albany, N. Y.
Wilbur Howard Fisher, Hannibal, Mo.
Charles Gilman, New York City.
William Lawrence Hanavan, New York City.
John Philip Hogan, New York City.
Harry Northrop Howe, Greenville, Miss.
Samuel James Lewis, Montrose, Colo.
Clarence Adkins Neal, Kansas City, Mo.
John Castlereagh Parker, Niagara Falls, N. Y.
George Johnson Walker, Self, Ark.
Lee Field Whitbeck, Durango, Dgo., Mexico.

The Secretary announced the following deaths:

Frederick Reginald French; elected Member September 7th, 1904; died November 20th, 1904.

Lorenzo Medici Johnson; elected Junior March 3d, 1875; Member April 7th, 1880; died November 28th, 1904.

Adjourned.

December 21st, 1904.—The meeting was called to order at 8.45 P. M., Vice-President S. L. F. Deyo in the chair; Chas. Warren Hunt, Secretary; and present, also, 97 members and 13 guests.

A paper, entitled "The Reclamation of River Deltas and Salt Marshes," by J. Francis Le Baron, M. Am. Soc. C. E., was presented by the Secretary, who also read a communication on the subject from E. L. Corthell, M. Am. Soc. C. E.

The paper was discussed by Richard Lamb, M. Am. Soc. C. E.

The Secretary announced the following deaths:

JACOB ALBERT LATCHA, elected Member May 7th, 1873; died November 30th, 1904.

WILSON CROSBY, elected Member September 15th, 1869; died December 18th, 1904.

Adjourned.

OF THE BOARD OF DIRECTION.

(Abstract.)

December 6th, 1904.—8.35 P. M.—Vice-President Curtis in the Chair; Chas. Warren Hunt, Secretary; and present, also, Messrs. Buck, Croes, Deyo, Ellis, Gowen, Knap, N. P. Lewis, Noble, Osgood, Pegram, Webster and Wilgus.

A report, from the Committee on Entertainment of the party of members of the British Institution of Civil Engineers, was received, which showed that the funds of the Society had not been drawn upon for this purpose, and that 55% of the amount subscribed had been returned *pro rata* to the subscribers.

The following resolution was adopted:

"*Resolved,* That the thanks of the Board of Direction of the American Society of Civil Engineers are hereby tendered to Paul A. Seurot, M. Am. Soc. C. E., for his aid in the translation of a number of French papers for the International Engineering Congress."

A Committee was appointed to confer with the Architect and to report plans for the enlargement of the Society House.

A Committee of Arrangements for the Annual Meeting was appointed:

The following resignations were accepted, to take effect December 31st, 1904:

Max Boehmer, M. Am. Soc. C. E.; Duncan Lee Despard, Assoc. M. Am. Soc. C. E.; Edward Betts Brisley, Jun. Am. Soc. C. E.

Applications were considered and other routine business transacted.

Five Associate Members were transferred to the grade of Member, and twelve candidates for Junior were elected.

Adjourned.

ANNOUNCEMENTS.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

MEETINGS.

Wednesday, January 4th, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper, entitled "Methods of Location on the Choctaw, Oklahoma and Gulf Railroad," by F. Lavis, Assoc. M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

Wednesday, February 1st, 1905.—8.30 P. M.—A regular business meeting will be held. Ballots for membership will be canvassed, and a paper entitled "Maximum Rates of Rainfall at Boston," by Charles W. Sherman, M. Am. Soc. C. E., will be presented for discussion.

This paper is printed in this number of *Proceedings.*

ANNUAL MEETING.

The Fifty-second Annual Meeting will be held at the Society House, January 18th and 19th, 1905. The Business Meeting will be called to order at 10 o'clock on Wednesday morning. The Annual Reports will be read, officers for the ensuing year elected, and members of the Nominating Committee appointed.

Arrangements for the excursions and entertainments have been placed in the hands of the following committee:

JOHN W. ELLIS, *Chairman;*
GEORGE S. WEBSTER, CHARLES L. HARRISON,
J. WALDO SMITH, CHAS. WARREN HUNT.

NOMINATING COMMITTEE.

The Constitution provides that at the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the seven geographical districts, into which the territory occupied by the Membership is divided for this purpose, shall be appointed by the meeting to serve for two years.

The usual blank request for suggestions as to representatives of each district, for presentation to the meeting, has been mailed to Corporate members.

PRIVILEGES OF LOCAL SOCIETIES EXTENDED TO MEMBERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

The Boston Society of Civil Engineers will welcome any member of the American Society of Civil Engineers at its library and reading room, 517 Tremont Temple, Boston, which is open on week days from 9 A. M. to 5 P. M. Members will also be welcome at the meetings, which are held in the same building, on the evenings of the fourth Wednesday in January, and the third Wednesdays of other months, except July and August.

The rooms of **The St. Louis Engineers' Club,** are in the business center of St. Louis, and visiting engineers are cordially invited to use them for mail, telephone service, information, etc.

The courtesies of **The Engineers' Society of Western Pennsylvania** have been extended to members of the American Society of Civil Engineers. The rooms of the Society, 410 Penn Ave., Pittsburg, Pa., are open at all times, and meetings are held as follows, except during July and August. REGULAR SECTION, Third Tuesdays; CHEMICAL SECTION, Thursdays following third Tuesdays; MECHANICAL SECTION, First Tuesdays; STRUCTURAL SECTION, Fourth Tuesdays.

The Western Society of Engineers, Monadnock Block, Chicago, Ill., tenders to members of this Society the use of its rooms and facilities, together with the good offices of its Secretary and of a special committee appointed for that purpose.

The Civil Engineers' Club of Cleveland, Ohio, invites members of this Society to make use of the Club rooms, at any time when in Cleveland. Cards will be furnished on application to the Secretary, Mr. J. C. Beardsley.

The Engineers' Club of Central Pennsylvania has established new quarters at the corner of Second and Walnut Streets, Harrisburg, Pa., and desires to extend the courtesies of the Club to visiting members of the American Society of Civil Engineers.

SEARCHES IN THE LIBRARY.

In January, 1902, the Secretary was authorized to make searches in the Library, upon request, and to charge therefor the actual cost to the Society for the extra work required. Since that time many such searches have been made, and bibliographies and other information on special subjects furnished.

The resulting satisfaction, to the members who have made use of the resources of the Society in this manner, has been expressed frequently, and leaves little doubt that, if it were generally known to the membership that such work would be undertaken, many would avail themselves of it.

The cost is trifling, compared with the value of the time of an engineer who looks up such matters himself, and the work can be performed quite as well, and much more quickly, by persons familiar with the Library.

Copies of all lists of references are filed, so that in many cases it is only necessary to make a typewritten copy, which reduces the cost of searches to a minimum.

In asking that such work be undertaken, members should specify clearly the subject to be covered, and whether references to general books only are desired, or whether a complete bibliography, involving search through periodical literature, is desired.

ACCESSIONS TO THE LIBRARY.

November 8th to December 13th, 1904.

DONATIONS.*

FOWLER'S ELECTRICAL YEAR BOOK;

And Directory of Light, Power and Traction Stations, 1905. Boards, 6 x 4 in., 588 pp., illus. Manchester, Scientific Publishing Company. 1 shilling 6 pence, net.

In this edition of the Year Book substantial additions have been made to the several sections dealing with the types and use of electrical measuring instruments. The section on the running of dynamos in parallel, as well as some notes on the management of dynamos, the preface states, will, it is hoped, prove useful. The recommendations of the British Standards Committee for generators and motors have been embodied in the present edition, while additions have been made to the sections dealing with electrical distribution, secondary batteries, and lighting. The extension of the application of alternating current has demanded more extensive treatment, and some additions have been made to the subject of electric traction.

AMERICAN RAILWAY SHOP SYSTEMS.

By Walter G. Berg, M. Am. Soc. C. E. Cloth, 9 x 6 in., 198 pp., illus. New York, *The Railroad Gazette*, 1904.

The aim of the author in presenting this treatise has been to collect, in convenient form for reference, general information as to the layout and leading characteristics of railway repair shops, particular attention being paid to establishing a special grouping and classification of shops as an aid to an intelligent analysis and understanding of the subject. The Contents are: Classification and General Layout; General Repair Shops; Locomotive Repair Shops; Passenger Car Repair Shops; Freight Car Repair Shops; General Shop Store Houses; Power Plant and Machinery; Structural Work of Buildings and Auxiliary Features. The book contains a bibliography of eight pages, and a large number of illustrations.

EXPERIMENTS WITH ALTERNATE CURRENTS OF HIGH POTENTIAL AND HIGH FREQUENCY.

A Lecture Delivered Before the Institution of Electrical Engineers, London; With an Appendix on the Transmission of Electric Energy without Wires, Reviewing his Recent Work, and Presenting Illustrations from Photographs never before Published; With a New Portrait and a Biographical Sketch of the Author. By Nicola Tesla. New Edition, cloth, 7 x 5 in., 9 + 162 pp., illus. New York, McGraw Publishing Company, 1904. $1.00.

Since the year 1890 Mr. Tesla has devoted himself entirely to the study of alternating currents of high frequencies and very high potentials, with which he is at present engaged. The biographical introduction states that no comment is necessary on his interesting achievements in this field. His first lecture on his researches in this new branch of electricity, was delivered before the American Institute of Electrical Engineers on May 20, 1891. The present lecture forms in a measure a continuation of the latter, and includes chiefly the results of his researches since that time.

THE ASSUAN RESERVOIR AND LAKE MOERIS.

A Lecture Delivered at a Meeting of the Khedivial Geographical Society, Cairo, 16th January, 1904; with Translations in French and Arabic. By Sir William Willcocks. Cloth, 10 x 7 in., 36 + 40 + 40 pp., illus. New York, Spon and Chamberlain, 1904. $2 00.

In this lecture the author outlines what is in his opinion the best method to secure additional water for irrigation in Egypt and at the same time obtain protection from floods. He describes the Assuân Dam and the design for raising it and the project for the Wady Rayan Reservoir, or the modern Lake Moeris, and also describes the proposed rectification of the Nile by a system of jetties at the Rosetta mouth of the river.

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* Unless otherwise specified, books in this list have been donated by the publisher.

LES RICHESSE MINERALES DE LA NOUVELLE-CALEDONIE.

Rapport a M. le Ministre des Colonies. Par E. Glasser. Paper, 9 x 5 in., 560 pp., illus. Paris, Vve. Ch. Dunod, 1904. 10 francs.

The Minister of the Colonies, for France, charged the author with a mission to New Caledonia, for the purpose of studying its mineral wealth; the results are contained in this book. After giving general information on the geological formation of the different deposits of New Caledonia, the author writes of each mineral in turn, giving its known beds, the manner of working them, the industrial conditions, and of what development they appear susceptible. Nickel, cobalt, chrome, iron, copper, gold, coal, etc., are thus reviewed. The work ends with considerations on the future of the mines of the colony and the measures to be taken to assure their success. The book contains six maps and plates.

Gifts have also been received from the following:

Albany State Engr. and Surv. 3 pam.
Allentown—Water Dept. 1 pam.
Alvord, J. W. 1 pam.
Am. Inst. of Elec. Engrs. 1 bd. vol.
Am. Inst. of Min. Engrs. 2 pam.
Am. Iron and Steel Assoc. 1 pam.
Am. Ry. Assoc. 1 vol.
Am. Soc. of Mech. Engrs. 1 pam.
Am. Water Works Assoc. 1 vol.
Boston—Transit Comm. 1 bd. vol.
Brit. Fire Prevention Committee. 1 vol., 1 pam.
Brooks, Fred. 1 pam.
Burr, W. H. 1 pam.
Cal.—Dept. of Highways. 2 pam.
Canada—Geol. Surv. 1 bd. vol., 1 vol.
Cincinnati—Engr. Dept. 1 pam.
Cincinnati, New Orleans & Texas Pacific Ry. Co. 1 pam.
Colo. Agri. Coll. 2 pam.
Detroit—Board of Water Commrs. 1 pam.
District of Columbia—Engr. Comm. 1 pam.
Fisk, W. L. 1 pam., 2 maps.
Fisk & Robinson. 1 pam.
Francois, Felix. 1 pam.
Great Brit.—Patent Office. 4 vol., 14 pam.
Houston, J. J. L. 1 bd. vol.
Huergo, L. A. 25 pam. 13 vol.
Indian Midland Ry. Co. 1 pam.
Ill.—Bureau of Labor Statistics. 1 bd. vol.
Inst. of Civ. Engrs. 1 bd. vol.
Inst. of Engrs. & Shipbuilders in Scotland. 1 bd. vol.
Inst. of Mech. Engrs. 1 vol.
Kansas City Southern Ry. Co. 1 pam.
Kirchbach, Frank. 1 pam.
Long Island R. R. Co. 1 pam.
La. & Arkansas Ry. Co. 1 pam.
Mich.—State Board of Health. 1 pam.
Municipal Art Soc. of N. Y. 1 pam.
National Electric Light Assoc. 1 bd. vol.
National Mosquito Extermination Society 1 pam.
N. Y.—Rapid Transit R. R. Comm. 1 bd. vol.
North of England Inst. of Min. & Mech. Engrs. 2 pam.
Permanent Inst. Assoc. of Navigation Cong. 1 vol.
Poor's R. R. Manual Co. 1 bd. vol.
Queensland—Harbours & Rivers Dept. 1 pam.
R. Scuola d'Applicazione per gl'Ingegneri. 1 pam.
Regnard, G. H. 1 pam.
Robertson, L. S. 1 bd. vol., 7 pam.
Rochester—Pub. Works Dept. 1 vol.
St. John—Water and Sewerage Dept. 1 pam.
Schmidt, Max E. 1 pam.
Smithsonian Inst. 1 bd. vol.
Soc. Anonyme Belge de Constructions Incombustibles. 3 pam.
Southern Pacific Co. 1 pam.
(Den) Tekniske og Hygiekniske Kongres. 1 vol.
U. S. Bureau of Forestry. 1 pam.
U. S. Bureau of Labor. 2 vol.
U. S. Bureau of Steam Eng. 1 pam.
U. S. Chief of Bureau of Yards and Docks. 1 pam.
U. S. Geol. Surv. 30 pam., 103 maps.
U. S. Interstate Commerce Comm. 2 pam.
U. S. Naval Observatory. 1 pam.
U. S. Office of Public Road Inquiries. 1 pam.
U. S Lib. of Cong. 1 bd. vol.
Univ. of Maine. 1 vol.
Vulcanite Portland Cement Co. 3 pam.
Wellisch. 1 pam.

BY PURCHASE.

The National Cyclopædia of American Biography: being the History of the United States as Illustrated in the Lives of the Founders, Builders and Defenders of the Republic, and of the Men and Women Who are Doing the Work and Moulding the Thoughts of the Present Time. Edited by distinguished biographers selected from each State. Revised and approved by the most eminent historians, scholars and statesmen of the day. Vol. 12. New York, James T. White & Co., 1904.

Reinforced Concrete. By Charles F. Marsh. New York, D. Van Nostrand Company, 1904.

SUMMARY OF ACCESSIONS.

November 8th to December 13th, 1904.

Donations (including 41 duplicates and 4 numbers of periodicals to complete volumes)	289
By purchase	2
Total	291

MEMBERSHIP.

ADDITIONS.

MEMBERS.		Date of Membership.
Austin, William Eugene. 7 Wall St., New York City (Res., 159 Greenwood Ave., East Orange, N. J.)		Dec. 7, 1904
Fickes, Edwin Stanton. Chf. Engr and Purchasing Agt. for The Pittsburg Reduction Co., Pittsburg, Pa	Jun. Assoc. M. M.	Jan. 4, 1898 Feb. 6, 1901 Dec. 6, 1904
French, Arthur Willard. Prof. of Civ. Eng., Worcester Polytechnic Inst., Worcester, Mass	Assoc. M. M.	April 4, 1900 Dec. 6, 1904
Phillips, Richard Harvey. 503 Security Bldg., St. Louis, Mo.		Dec. 7, 1904
Smith, Stewart Kedzie. Billings, Mont		April 6, 1904
Spencer, John Clark. Care, Am. Bridge Co., 802 Frick Bldg., Pittsburg, Pa	Assoc. M. M.	May 6, 1896 Dec. 6, 1904
Williams, Charles Page. Engr., U. S. Reclamation Service, Cody, Wyo	Assoc. M. M.	Oct. 2, 1901 Nov. 1, 1904
ASSOCIATE MEMBERS.		
Bowne, William Hunt. Glen Cove, N. Y		Dec. 7, 1904
Bugbee, Newton Albert Kendall. 207 Academy St., Trenton, N. J		Oct. 5, 1904
Corrigan, George Washington. Asst. Engr., Mo. Pac. Ry., 3756 Cook Ave., St. Louis, Mo	Jun. Assoc. M.	Feb. 5, 1901 Oct. 5, 1904
Culgin, Guy Whitmore. Engr. and Gen. Contr. (Culgin & Pace), 133 West 129th St., New York City	Jun. Assoc. M.	Mar. 6, 1900 Sept. 7, 1904
Curtis, Varnum Pierce. 96 Stafford St., Worcester, Mass		Dec. 7, 1904
Fairchild, Samuel Edwards, Jr. Franklin Bldg., Philadelphia, Pa		Dec. 7, 1904
Holdrege, Henry Atkinson. Gen. Mgr., Omaha Elec. Light & Power Co., Omaha, Nebr		Dec. 7, 1904
Horstman, Joseph Prosper. P. O. Box 481, Parkersburg, W. Va		Dec. 7, 1904
Horton, Robert Elmer. 75 Arcade, Utica, N. Y		Dec. 7, 1904
Huntington, George Danforth. 25 Washington St., Watertown, N. Y		Dec. 7, 1904
McCulloch, Robert Austen. Archt., 51 Chambers St., New York City (Res., 80 Hillside Ave., Orange, N. J.)	Jun. Assoc. M.	Sept. 2, 1902 Sept. 7, 1904
Pfeiffer, George Whitfield. Supt., Spanish-American Iron Co., Daiquiri, Cuba		Oct. 5, 1904
Pillsbury, George Bigelow. 1st Lieut., Corps of Engrs., Adjutant, 2d Battalion of Engrs., Washington Barracks, Washington, D. C		Dec. 7, 1904
Pugh, Marshall Rogers. 1334 Real Estate Trust Bldg., Philadelphia, Pa		Dec. 7, 1904

		Date of Membership.
Sears, Thomas Bartlett. Farmington, San Juan Co., N. Mex		Oct. 5, 1904
Shaner, Harry Linden. Chf. Engr., Gravity Water Supply, Lynchburgh, Va.		Dec. 7, 1904
Shepherd, Frank Cummings. N. Y. C. & H. R. R. R. Co., Grand Central Palace, 43d St. and Lexington Ave., New York City		Oct. 5, 1904
Stevenson, William Freeman. 708 St. Nicholas Ave., New York City		Oct. 5, 1904
Wilgus, Herbert Sedgwick. Engr., Way and Structure, B. H. R. R. (Res., 90 Greene Ave., Brooklyn, N. Y.	Jun. Assoc. Assoc. M.	Oct. 1, 1901 Nov. 3, 1903 Nov. 1, 1904

JUNIORS.

Alexander, Robert Lee. U. S. Surveyman, Mound, Chittenden Co., Ark.	Nov. 1, 1904
Ball, Laurence Adams. 108 West 49th St., New York City	May 3, 1904
Breuchaud, Jules Rowley. Croton-on-Hudson, N. Y.	Nov. 1, 1904
Castellanos, Cesar. Hotel Gillow, City of Mexico, Mexico	Oct. 6, 1903
Coffin, Theodore DeLong. 128 Union Hall St., Jamaica, N. Y.	Nov. 1, 1904
Hale, Herbert Miller. 430 West 118th St., New York City.	Nov. 1, 1904
Hilder, Frazer Croswell. 217 F St., Washington, D. C.	Sept. 6, 1904
Johnson, Luther Elman. Box 592, Lawton, Okla.	Sept. 6, 1904
Kahn, Gustave Edmund. 350 Greenbush St., Milwaukee, Wis.	Sept. 6, 1904
Neal, Clarence Adkins. 318 Waldron Ave., Kansas City, Mo.	Dec. 6, 1904
Parker, John Castlereagh. 244 Fifth Ave., Niagara Falls, N. Y.	Dec. 6, 1904
Perry, John Prince Hazen. Asst. Engr., L. I. R. R., cor. Van Wyck Ave. and Beaufort St., Jamaica, N. Y.	Nov. 1, 1904
Phillips, William Hale. 2430 Bancroft Way, Berkeley, Cal.	Nov. 1, 1904
Talbot, Earle. Care, Union Trust Co. of San Francisco, San Francisco, Cal.	Nov. 1, 1904
Westover, Henry Christopher. 1313 Felix St., St. Joseph, Mo.	Nov. 1, 1904
Wilcox, Frank Leslie. Hotel Cameron, Cameron, Mo.	Sept. 6, 1904

DEATHS.

French, Frederick Reginald........Elected Member, September 7th, 1904; died November 20th, 1904.

Johnson, Lorenzo Medici............Elected Member, April 7th, 1880; died November 28th, 1904.

Latcha, Jacob Albert...............Elected Member, May 7th, 1873; died November 30th, 1904.

MONTHLY LIST OF RECENT ENGINEERING ARTICLES OF INTEREST.

(November 6th to December 10th, 1904.)

NOTE.—*This list is published for the purpose of placing before the members of the Society the titles of current engineering articles, which can be referred to in any available engineering library, or can be procured by addressing the publication directly, the address and price being given wherever possible.*

LIST OF PUBLICATIONS.

In the subjoined list of articles references are given by the number prefixed to each journal in this list.

(1) *Journal*, Assoc. Eng. Soc., 257 South Fourth St., Philadelphia, Pa., 30c.
(2) *Proceedings*, Engrs. Club of Phila., 1122 Girard St., Philadelphia, Pa.
(3) *Journal*, Franklin Inst., Philadelphia, Pa., 50c.
(4) *Journal*, Western Soc. of Engrs., Monadnock Block, Chicago, Ill.
(5) *Transactions*, Can. Soc. C. E., Montreal, Que., Canada.
(6) *School of Mines Quarterly*. Columbia Univ., New York City, 50c.
(7) *Technology Quarterly*. Mass. Inst. Tech., Boston, Mass., 75c.
(8) *Stevens Institute Indicator*, Stevens Inst., Hoboken, N. J., 50c.
(9) *Engineering Magazine*, New York City, 25c.
(10) *Cassier's Magazine*, New York City, 25c.
(11) *Engineering* (London), W. H. Wiley, New York City, 25c.
(12) *The Engineer* (London), International News Co., New York City, 35c.
(13) *Engineering News*, New York City, 15c.
(14) *The Engineering Record*, New York City, 12c.
(15) *Railroad Gazette*, New York City, 10c.
(16) *Engineering and Mining Journal*, New York City, 15c.
(17) *Street Railway Journal*, New York City, 35c.
(18) *Railway and Engineering Review*, Chicago, Ill., 10c.
(19) *Scientific American Supplement*, New York City, 10c.
(20) *Iron Age*, New York City, 10c.
(21) *Railway Engineer*, London, England, 25c.
(22) *Iron and Coal Trades Review*, London, England, 25c.
(23) *Bulletin*, American Iron and Steel Assoc., Philadelphia, Pa.
(24) *American Gas Light Journal*, New York City, 10c.
(25) *American Engineer*, New York City, 20c.
(26) *Electrical Review*, London, England.
(27) *Electrical World and Engineer*, New York City, 10c.
(28) *Journal*, New England Water-Works Assoc., Boston, $1.
(29) *Journal*, Society of Arts, London, England, 15c.
(30) *Annales des Travaux Publics de Belgique*, Brussels, Belgium.
(31) *Annales de l' Assoc. des Ing. Sortis des École Spéciales de Gand*, Brussels, Belgium.
(32) *Mémoires et Compte Rendu des Travaux*, Soc. Ing. Civ. de France, Paris, France.
(33) *Le Génie Civil*, Paris, France.
(34) *Portefeuille Économique des Machines*, Paris, France.
(35) *Nouvelles Annales de la Construction*, Paris, France.
(36) *La Revue Technique*. Paris, France.
(37) *Revue de Mécanique*, Paris, France.
(38) *Revue Générale des Chemins de Fer et des Tramways*, Paris, France.
(39) *Railway Master Mechanic*, Chicago, Ill., 10c.
(40) *Railway Age*, Chicago, Ill., 10c.
(41) *Modern Machinery*, Chicago, Ill., 10c.
(42) *Transactions*, Am. Inst. Elec. Engrs., New York City, 50c.
(43) *Annales des Ponts et Chaussées*, Paris, France.
(44) *Journal*, Military Service Institution, Governor's Island, New York Harbor, 50c.
(45) *Mines and Minerals*, Scranton, Pa., 20c.
(46) *Scientific American*, New York City, 8c.
(47) *Mechanical Engineer*, Manchester, England.
(54) *Transactions*, Am. Soc. C. E., New York City, $5.
(55) *Transactions*, Am. Soc. M. E., New York City, $10.
(56) *Transactions*, Am. Inst. Min. Engrs., New York City, $5.
(57) *Colliery Guardian*, London, England.
(58) *Proceedings*, Eng. Soc. W. Pa., 410 Penn Ave., Pittsburg, Pa., 50c.
(59) *Transactions*, Mining Inst. of Scotland, London and Newcastle-upon-Tyne, England.
(60) *Municipal Engineering*, Indianapolis, Ind., 25c.
(61) *Proceedings*. Western Railway Club, 225 Dearborn St., Chicago, Ill., 25c.
(62) *American Manufacturer and Iron World*, 59 Ninth St., Pittsburg, Pa.
(63) *Minutes of Proceedings*, Inst. C. E. London, England.
(64) *Power*, New York City, 20c
(65) *Official Proceedings*, New York Railroad Club, Brooklyn, N. Y., 15c.
(66) *Journal of Gas Lighting*, London, England, 15c.
(67) *Cement and Engineering News*, Chicago, Ill., 25c.
(68) *Mining Journal*, London, England.
(69) *Mill Owners*, New York City, 10c.
(70) *Engineering Review*, New York City, 10c.
(71) *Journal*, Iron and Steel Inst., London, England
(72) *Street Railway Review*, Chicago, 30c.
(73) *Electrician*, London, England, 18c.
(74) *Transactions*, Inst. of Min. and Metal., London, England.
(75) *Proceedings*, Inst. of Mech. Engrs., London, England.
(76) *Brick*, Chicago, 10c.
(77) *Journal*, Inst. Elec. Engrs., London, England.

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Bridge.

The Erection of Iron Bridges.* Russell Scott Scholefield. **(63)** Vol. 157.
The Breydon Viaduct at Great Yarmouth.* William Marriott and Theodore Graham Gribble, MM. Inst. C. E. **(63)** Vol. 157.
Ferro-Concrete Bridge.* **(12)** Oct. 28; **(11)** Oct. 28.
The Strength and Stability of Stone and Brick Bridges.* **(21)** Serial beginning Nov.
New Bridge Near Mayence.* **(12)** Nov. 11.
The Thebes Bridge.* **(14)** Nov. 12.
Renewing Bridges on the West Shore.* **(15)** Nov. 18.
The Anatomy of Bridgework.* W. H. Thorpe, Assoc. M. Inst. C. E. **(11)** Serial beginning Nov. 18.
Repairing a Wrecked Drawbridge over the Maumee River at Toledo.* **(14)** Nov. 19.
Designs for Bascule Bridges without Tail Pits.* **(13)** Nov. 24.
The Bridge over the Rhine at Thusis.* **(12)** Nov. 25.
A Large Sheet Pile Cofferdam.* **(14)** Nov. 26.
The Calumet River Drawbridge, Baltimore & Ohio R. R.* **(14)** Nov. 26.
The Erection of the Double-Track Mingo Cantilever Bridge over the Ohio River.* **(14)** Serial beginning Nov. 26.
Structural Details of the New Reinforced Concrete Bridge at Grand Rapids, Mich.* Wm. F. Tubesing. **(13)** Dec. 1.
An Interesting Steel Arch Bridge Design.* **(13)** Dec. 1.
The Quebec Bridge.* **(15)** Dec. 2.
Concrete Abutment on the Ulster & Delaware.* M. H. McGee. **(15)** Dec. 2.
Reinforced Concrete Arch Bridges, Como Park, St. Paul.* **(14)** Dec. 3.
The New Pend d'Oreille Bridge, Northern Pacific Ry.* **(18)** Dec. 3.
The South Tenth Street Bridge, Pittsburg.* **(14)** Dec. 10.
Reconstruction of Viaduct over the Michigan Central Railroad, by Michigan Traction Company, near Galesburg, Mich.* **(17)** Dec. 10.

Electrical.

The Evolution of the Submarine Telegraph.* Charles Bright, Assoc. M. Inst. C. E. **(63)** Vol. 157.
Some Notes on the Edison Nickel-Iron Storage Battery.* F. M. Davis. **(4)** Oct.
Thirty-Thousand-Volt Transmission. J. F. Kelly and A. C. Bunker. (Abstract of Paper read before the International Elec. Cong.) **(73)** Oct. 28.
The Measurement of the Potential of the Electrodes in Stationary Liquids.* Henry J. S. Sands. (Paper read before the Faraday Soc.) **(73)** Serial beginning Oct. 28.
Notes on Faults in Small Lead-Covered Wires.* Donald Smeaton Munro. **(26)** Oct. 28.
The Lancashire Dynamo and Motor Co.'s Works at Trafford Park.* **(26)** Oct. 28; **(12)** Nov. 18.
The So-Called International Electrical Units. F. A. Wolff. (Abstract of Paper read before the International Elec. Cong.) **(26)** Oct. 28.
The Superiority of Alternating Current for the Supply of Current to Large Cities. Gotthold Stern. (Abstract of Paper read before the International Elec. Cong.) **(73)** Oct. 28.
Transformer with a Large Electrostatic Capacity.* **(73)** Oct. 28.
The Unobtained Wave-Lengths between the Longest Thermal and the Shortest Electric Wave Yet Measured. E. F. Nichols. (Abstract of Paper read before the International Elec. Cong.) **(73)** Oct. 28.
The Transposition of Electrical Conductors.* Frank F. Fowle. **(42)** Nov.
The Short-Circuit Current of an Induction Motor.* G. W. Howe. **(73)** Nov. 4.
Coherer Action.* K. E. Guthe. (Abstract of Paper read before the International Elec. Cong.) **(73)** Nov. 4.
Electrolytic Receivers in Wireless Telegraphy.* Lee De Forest. (Abstract of Paper read before the International Elec. Cong.) **(73)** Nov. 4.
The Bay Counties Power Co.'s Transmission System. L. M. Hancock. (Abstract of Paper read before the International Elec. Cong.) **(73)** Nov. 4.
American Practice in High-Tension Line Construction and Operation. F. A. C. Perrine. (Abstract of Paper read before the International Elec. Cong.) **(73)** Nov. 4.
Heysham Harbour Electric Power Plant.* **(26)** Nov. 4.
Economics of a 200-Mile Transmission.* J. Eugene Wallace. **(27)** Nov. 5.
The Testing of Transformer Iron.* Lancelot W. Wild. **(73)** Nov. 11.
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The Press-Button Control of Lifts.* **(12)** Nov. 11.
The Stalybridge, Hyde, Mossley and Dukinfield Tramways and Electricity Board's Scheme.* **(26)** Nov. 11.
Report on the Wireless Telegraph Communication Between St. Louis and Chicago.* **(27)** Nov. 12.
The Power Plant of the Lewis Publishing Company, St. Louis, and the Largest Searchlight in the World.* **(27)** Nov. 12.
Thermo-Electric Receivers for Wireless Telegraphy and Telephony.* **(19)** Nov. 12.
The Willesden Power House, London, England.* **(27)** Nov. 12.
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* Illustrated.

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The Radcliffe U. D. C. Electricity Works.* (**26**) Nov. 18.
York Corporation Electricity Works.* (**26**) Nov. 18.
The Unipolar Dynamo.* J. Seidener. (From *Zeitschrift für Elektrotechnik.*) (**26**) Nov. 18.
An Application of Telpherage.* (**40**) Nov. 18.
Methods of Cable Laying.* Leonard Andrews. (**73**) Nov. 18.
The St. Louis Exhibition (Electrical Exhibits). (**11**) Nov. 18.
Insulation for High Pressures.* Harris J. Ryan. (Abstract of Paper read before the International Elec. Cong.) (**73**) Nov. 18.
Telegraphy and Telephony in Japan. Saitaro Oi. (Abstract of Paper read before the International Elec. Cong.) (**73**) Nov. 18.
Modern High-Speed Printing Telegraph Systems. J. C. Barclay. (Paper presented before the International Elec. Cong.) (**19**) Nov. 19.
Siemens & Halske Printing Telegraph or Telecryptograph.* L. Ramakers. (**19**) Nov. 19.
The Testing of Lightning Rods. (Tr. from *Allgemeine Chemiker Zeitung.*) (**19**) Nov. 19.
Speed Indicators.* Clarence P. Feldmann. (**27**) Nov. 19.
An Alternating Current Relay for Low Frequencies.* Frank F. Fowle. (**27**) Nov. 19.
Latest Improvements in Carbon-Making. Eugene Ornstein. (After a Lecture of T. Zellner.) (**26**) Nov. 25.
The St. Louis Exhibition: The Exhibits of the Electrical Controller and Supply Company. (**11**) Nov. 25.
Electric Traveling-Cranes at the St. Louis Exhibition.* (**11**) Nov. 25.
A Method of Measuring Magnetomotive Forces.* Rudolf Goldschmidt. (**73**) Nov. 25.
The Alternating-Current Theory of Transmission Speed Over Submarine Telegraph Cables. A. E. Kennelly. (Abstract of Paper read before the St. Louis International Elec. Cong.) (**73**) Nov. 25.
Starting and Regulating Resistances.* (**73**) Nov. 25.
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An Economical Power Plant at Lima, Ohio.* Frank B. Rae. (**17**) Nov. 26.
Electric Transmission Devices for Automobiles: The Jeantaud and the Electrogenia Systems.* (**19**) Nov. 26.
The Induction Motor with High Resistance Secondary. C. J. Spencer. (**27**) Nov. 26.
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The Commercial Development of Water Power. Alton D. Adams. (**10**) Dec.
The Principles of Exchange Telephony. Herbert Laws Webb. (**10**) Dec.
Coal Conveying Plant at Stuart Street, Manchester, Power Station.* I. William Chubb. (**64**) Dec.
Efficiency of Closed Heaters. W. E. Crane. (**64**) Dec.
Electrical Pointers.* W. H. Wakeman. (**64**) Dec.
Installing Electric Motors.* William Kavanagh. (**64**) Dec.
Multiple Voltage Control of Motors.* Norman Gardner Meade. (**64**) Dec.
A New Form of Liquid Rheostat for Starting Electric Motors.* (**46**) Dec. 3.
The Combined Lighting and Heating Plant of the Columbus, Ohio, Public Service Company.* (**27**) Dec. 3.
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Commutation in Alternating-Current Motors at Starting.* Marius Latour. (**27**) Dec. 3.
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Steam Closing Stop Valves for Boilers.* A. B. Willits. (20) Nov. 24.
Simple Methods in Warship Design a Necessity.* George W. Dickie. (Abstract of Paper read before the Soc. of Naval Archts. and Marine Engrs.) (13) Nov. 24.
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Interesting Repair Work on the Steamship *Ekliptika.** Alfred Gradenwitz. (19) Nov. 26.
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An Improved Gas Apparatus.* J. E. Babb. (58) Oct.
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Torsional Vibration of Shafts. Isaac Vincent Robinson. Stud. Inst. C. E. (Abridged.) (63) Vol. 157.
Rotary Kiln Fuel Consumption. P. O. Krottnaurer. (67) Oct.
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Chemistry in the Foundry. R. Moldenke. (Paper read before the New England Foundrymen's Assoc.) (20) Nov. 24.

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* Illustrated.

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Steam Engines and Turbines. F. H. Bowman. (Lecture before the National Assoc. of Colliery Mgrs.) (**22**) Nov. 25.
The Coming of the Gas Turbine. E. Kilburn Scott, A. M. I. C. E. (**26**) Nov. 25.
The Smoke Problem.* F. J. Rowan. (Paper read before the Inst. of Engrs. and Shipbuilders in Scotland.) (**47**) Serial beginning Nov. 26.
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Comparison of Boiler Trials.* J. H. Wallace. (**64**) Dec.
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Les Principaux Ports de la Manche Servant au Transit Entre la France et l'Angleterre R. Bonnin. (36) Serial beginning Oct. 25.

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* Illustrated.

AMERICAN SOCIETY

OF

CIVIL ENGINEERS.

Instituted November 5, 1852.

CONSTITUTION AND LIST OF MEMBERS.

FEBRUARY 10th, 1904.

House of the Society, 220 West Fifty-seventh Street,
NEW YORK.

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HOUSE OF THE SOCIETY,

220 West 57th Street.

Cable Address:
"Ceas, New York."

Telephone:
533 Columbus.

CALENDAR.

1904-05.

DATES OF MEETINGS IN BOLD-FACED TYPE.

FEBRUARY

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JANUARY

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NOTE.—Regular meetings are called to order at 8.30 P. M.

The House of the Society is open from 9 A. M. to 10 P. M. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

The Annual Convention will be held at St. Louis, Mo., on Oct. 3d, 4th, 5th, 6th, 7th and 8th, 1904.

CONSTITUTION.

ADOPTED MARCH 4TH, 1891.*

ARTICLE I.—NAME, LOCATION AND OBJECT.

1.—The name of this Association shall be the AMERICAN SOCIETY OF CIVIL ENGINEERS.

2.—The offices of the Society shall be located in the City of New York.

3.—Its objects shall be the advancement of engineering knowledge and practice and the maintenance of a high professional standard among its members.

4.—Among the means to be employed for this purpose shall be: meetings for the presentation and discussion of appropriate papers and for social and professional intercourse; the publication of such papers and discussions as may be deemed expedient; the maintenance of a library, the collection of maps, drawings and models, and the establishment of facilities for their use.

ARTICLE II.—MEMBERSHIP.

1.—The Corporate Members of this Society shall be designated as Members and Associate Members. There may also be connected with the Society, Honorary Members, Associates, Juniors and Fellows who shall be entitled to all the privileges of the Society, except the right to vote and to hold office therein; provided that Honorary Members elected from the Corporate Members of the Society shall retain their right to vote and to hold office.

2.—A Member shall be a Civil, Military, Naval, Mining, Mechanical, Electrical, or other professional Engineer, an Architect or a Marine Architect. He shall be at the time of admission to membership not less than thirty years of age, and shall have been in the active practice of his profession for ten years; he shall have had responsible charge of work for at least five years, and shall be qualified to design as well as to direct engineering works. Graduation from a school of engineering of recognized reputation shall be considered as equivalent to two years' active practice. The performance of the duties of a Professor of Engineering in a technical school of a high grade shall be taken as an equivalent to an equal number of years of actual practice.

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* Amended October 3d, 1894; March 6th, 1895; October 6th, 1897; October 5th, 1898; October 3d, 1900; March 4th 1903, and October 7th, 1903.

3.—An Associate Member shall be a professional Engineer or Architect not less than twenty-five years of age, who shall have been in the active practice of his profession for at least six years, and who shall have had responsible charge of work as principal or assistant for at least one year. Graduation from a school of engineering of recognized reputation shall be considered as equivalent to two years' active practice.

4.—Any person having the necessary qualifications prescribed in this article to entitle him to admission to the grades of Member or Associate Member, shall be eligible for such membership, though he may not be practicing his profession at the time of making his application.

5.—An Associate shall be a person who, by scientific acquirements or practical experience, has attained a position in his special pursuit qualifying him to co-operate with engineers in the advancement of professional knowledge and practice, but who is not a professional engineer.

6.—A Junior shall not be less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty-two years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. Persons who are in the Junior class at the time of the adoption of this Constitution shall not have their status changed by the provisions of this section.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, though they may not be eligible for admission as Corporate Members.

ARTICLE III.—Admissions and Expulsions.

1.—Honorary Members shall be proposed by at least ten members, and shall be elected only by a unanimous vote of the Board of Direction. A Past-President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be cancelled if an acceptance is not received within six months after the mailing of such notice.

All members other than Honorary Members and Juniors shall be admitted to the Society only by vote of the Corporate Members, as hereinafter specified.

2.—An application for admission to the Society or for transfer from one grade to another shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall furnish the names of at least five Corporate Members to whom he is personally known. Each of these shall be requested by the Secretary to address a letter to the Board of Direction, on a form prescribed by said Board, stating the extent of the writer's personal knowledge of the applicant and of his professional work. If at least five of the Corporate Members named as references do not furnish the requisite endorsement, the Secretary shall call upon the applicant for additional names, and not until written communications shall have been received from at least five Corporate Members shall the application be considered by the Board.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by five members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for admission or for transfer, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of his references, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; shall classify the applicant with his consent, and on application for admission may direct a ballot.

The Board shall have the power to elect persons to the grade of Junior, and to transfer persons from any grade except that of Junior to a higher grade of membership, and shall notify the membership of its action.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Twenty or more negative votes shall exclude from election. In case of exclusion, no notice thereof shall be entered on the minutes, but the candidate shall be notified.

A rejected applicant may renew his application for membership at any time after the expiration of one year from the date of the ballot rejecting his previous application.

5.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

6.—Upon the written request of ten or more Corporate Members, that for cause therein set forth a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defence which shall be considered at a meeting of the Board of Direction, of which he shall receive due notice. Not less than two months after such meeting, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defence made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

7.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction; when, if all his dues have been paid, his resignation shall be accepted.

8.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York, shall be deemed Resident; and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

ARTICLE IV.—Dues.

1.—The entrance fees payable on admission to the Society shall be as follows: by Members, thirty dollars; Associate Members, twenty-five dollars; Associates, twenty dollars; Juniors, ten dollars.

2.—The annual dues payable by members, whether Resident or Non-Resident, shall be as follows: by Corporate Members, fifteen dollars; Associates, ten dollars; Juniors, ten dollars.

3.—In addition to the dues prescribed in the preceding section, each Resident Member shall pay annually as follows: Corporate Members, ten dollars; Associates, five dollars; Juniors, five dollars.

4.—A person transferred from any grade to a higher one shall pay the difference between the entrance fees of the two grades, and his annual dues shall be those of the higher grade.

5.—The annual contributions shall become due for the ensuing year on the first day of January, and shall be payable in advance. It shall be the duty of the Secretary to notify each member of the amount due for the ensuing year at the time of giving notice of the Annual Meeting.

6.—Persons elected after six months of any fiscal year shall have expired, shall pay only one-half of the amount of dues for that fiscal year.

7.—All future annual dues may be compounded by a single payment by a Corporate Member of $250; or by an Associate of $150. Should a compounding Associate be elected to Corporate Membership he shall pay the further sum of $100.

Provided, that all compounding Corporate Members or Associates who may be or hereafter become Resident, shall be and remain liable for the annual payment of the difference between the annual dues of Resident and Non-

Resident Corporate Members, or Associates; but any Corporate Member may at any time compound for the future payment of all annual dues of every nature and kind by the payment of $75 in addition to the $250 hereinbefore named; and any Associate may at any time compound for the future payment of all annual dues as Associate by the payment of $40 in addition to the $150 hereinbefore named.

Provided, that any person desiring to compound for future dues shall have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum may be available.

Persons compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged; and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

All moneys thus paid in commutation of annual dues shall be invested as a permanent fund, only the interest thereupon being subject to appropriation for current expenses.

8.—Any person whose dues are more than three months in arrears shall be notified by the Secretary. Should his dues not be paid when they become six months in arrears, he shall lose the right to vote or to receive the publications of the Society. Should his dues become nine months in arrears, he shall again be notified in form prescribed by the Board of Direction, and if such dues become one year in arrears, he shall forfeit his connection with the Society. The Board of Direction, however, may, for cause deemed by it sufficient, extend the time for payment and for the application of these penalties.

9.—The Board of Direction may, for sufficient cause, temporarily excuse from payment of annual dues any member who from ill health, advanced age, or other good reason assigned, is unable to pay such dues; and the Board may remit the whole or part of dues in arrears, or accept in lieu thereof, desirable additions to the Library, or collections.

10.—Every person admitted to the Society shall be considered as belonging thereto and liable for the payment of all dues until he shall have resigned, been expelled, or have been relieved therefrom by the Board of Direction.

11.—Persons elected as Fellows shall become such upon the payment of Two Hundred and Fifty dollars into the permanent funds of the Society. They shall not be liable for other fees and dues.

12.—The status of any present subscribers shall not be changed by the provisions of this Constitution.

ARTICLE V.—Officers.

1.—The officers of the Society shall be a President, four Vice-Presidents, eighteen Directors, a Secretary, and a Treasurer, who, with the five latest living Past-Presidents, who continue to be members, shall constitute the Board of Direction in which the government of the Society shall be vested, and who shall be the Trustees as provided for by the laws under which the Society is organized. For the election of Honorary Members, all the Past-Presidents shall be members of the Board of Direction, except any Past-President who may be disqualified by mental or bodily infirmity, and the evidence of said disqualification shall be a written certificate from his attending physician, or some officer of the Society.

2.—The terms of office of the President, Secretary and Treasurer shall be one year; of the Vice-Presidents, two years; and of the Directors, three years. Provided, however, that at the first election after the adoption of this Constitution, four Vice-Presidents and eighteen Directors shall be elected, of whom two Vice-Presidents and six Directors shall be elected to serve for one year only, and six Directors for two years only; provided. also, that after the first election two Vice-Presidents and six Directors shall be elected each year.

The term of each officer shall begin at the close of the Annual Meeting at which such officer is elected, and shall continue for the period above named or until a successor is duly elected.

3.—A vacancy in the office of President shall be filled by the senior Vice-President.

A vacancy in the office of Vice-President shall be filled by the senior Director. Seniority between persons holding similar offices shall be determined by priority of election to the office, and when these dates are the same, by priority of admission to Corporate Membership; and when the latter dates are identical, the selection shall be made by lot. In case of the disability or neglect in the performance of his duty, of any officer of this Society. the Board of Direction shall have power to declare the office vacant. Vacancies in any office for the unexpired term shall be filled by the Board of Direction, except as provided above.

4.—The President shall be ineligible for re-election. The Vice-Presidents and Directors shall not be eligible for re-election to the same office until at least one full term shall have elapsed after the end of their respective terms.

5.—At least one Vice-President, the Secretary and the Treasurer, and six Directors shall be Resident Corporate Members during their term of office.

ARTICLE VI.—MANAGEMENT.

1.—The President shall have a general supervision of the affairs of the Society. He shall preside at meetings of the Society and of the Board of Direction at which he may be present. and shall be *ex-officio* member of all committees. He shall deliver an address at the Annual Convention.

The Vice-Presidents in order of seniority shall preside at meetings in the absence of the President. and discharge his duties in case of a vacancy in the office.

2.—The Board of Direction shall manage the affairs of the Society in conformity to the laws under which the Society is organized and the provisions of this Constitution. It shall direct the investment and care of the funds of the Society; make appropriations for specific purposes; act upon applications for membership as heretofore provided; take measures to advance the interests of the Society; appoint all its employees; and generally direct its business. The Board of Direction shall make an annual report at the Annual Meeting, transmitting the report of the Treasurer and of other officers, and of Committees.

3. The Treasurer shall receive all moneys and deposit the same in the name of the Society. He shall invest all funds not needed for current disbursements, as shall be ordered by the Board of Direction. He shall pay all bills. when certified and audited, as provided by this Constitution and by

rules to be prescribed by the Board of Direction. He shall make an annual report and such other reports as may be prescribed by the Board of Direction.

The Board of Direction shall secure a satisfactory surety for the faithful performance of his duties by the Treasurer, and shall renew the same during the month of January of each year.

4. The Secretary shall be a Corporate Member of the Society. He shall be elected annually by the Board of Direction at the meeting to be held within twenty days after the Annual Meeting provided for in Section 7 of Article VI, or at an adjournment thereof, and shall hold the office for one year or until his successor is elected, provided that a majority of the whole Board of Direction shall be required to elect the Secretary; this vote to be given, if necessary, by letter.

He shall be, under the direction of the President and Board of Direction, the executive officer of the Society.

He will be expected to attend all meetings of the Society and of the Board of Direction; prepare the business therefor, and duly record the proceedings thereof.

He shall see that all moneys due the Society are carefully collected, and without loss transferred to the custody of the Treasurer.

He shall carefully scrutinize all expenditures, and use his best endeavor to secure economy in the administration of the Society.

He shall personally certify the accuracy of all bills or vouchers on which money is to be paid, and shall countersign the checks drawn by the Treasurer against the funds of the Society, when such drafts are known to him to be proper and duly authorized by the Finance Committee.

He shall have charge of the books of account of the Society, and shall furnish monthly to the Board of Direction a statement of receipts and expenses under their several headings, and also a statement of monthly balances. He shall present annually, to the Board of Direction, a balance sheet of his books, as of the 31st of December, and shall furnish, from time to time, such other statements as may be required of him.

He shall conduct the correspondence of the Society and keep full records of the same.

He shall have charge of the Society's house and its contents; shall supervise the work of all employees of the Society, and see that they diligently perform their respective duties.

He shall perform all other duties which may from time to time be assigned to him by the Board of Direction.

5.—The Board of Direction may also, if they deem it necessary, appoint an Assistant Secretary, who shall aid the Secretary and be under his immediate direction in all matters. His whole time shall be given to the Society.

6.—The Secretary and Treasurer shall be paid salaries to be determined by the Board of Direction; but such salaries shall not be reduced during the term of office, as provided in this Constitution. All other salaries shall be fixed, from time to time, by the Board of Direction.

7.—The Board of Direction shall meet within twenty days after the Annual Meeting, and shall then appoint from its members a Finance Committee of five, a Library Committee of five, and a Committee on Publications of five. At least three members of the Finance Committee, and two members of the other Committees, shall be resident within fifty miles of New York.

These Committees shall report to the Board of Direction, and perform their duties under its supervision.

8.—The Finance Committee shall have immediate supervision of the financial affairs of the Society; shall employ an expert accountant to audit the accounts monthly; shall approve all bills before payment, and shall make recommendations to the Board of Direction as to the investment of moneys, and as to other financial matters.

9.—The Library Committee shall have general supervision of the Library and the House of the Society and the property therein; shall make recommendations to the Board with reference thereto, and shall direct the expenditure for books and other articles of permanent value, of such sums as may be appropriated for these purposes.

10.—The Committee on Publications shall have general supervision of the publications of the Society, and of contracts and expenditures connected therewith.

11.—In the consideration of papers offered for presentation, those papers containing matter readily found elsewhere, those specially advocating personal interests, those carelessly prepared or controverting established facts, and those purely speculative or foreign to the purposes of the Society, shall be rejected. The Committee on Publications shall determine which papers shall be read in full, and which shall be printed after reading by title only. The Committee may return a paper to the writer for correction and emendation, and call to its aid one or more members of special experience relating to the subject treated, either to advise on the paper or to discuss it. Such papers as in the judgment of the Committee should appear in the *Transactions*, shall promptly, upon their acceptance, be printed and distributed to members of all grades; others shall, with the consent of the authors, be suitably indexed, and filed for reference, or the Committee may provide abstracts thereof, which, when approved by the authors, may be published instead of the original papers. Advance copies of papers and discussions may be sent out to the membership before final publication.

12.—Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: A proposition to appoint such a Committee shall be presented at a regular meeting of the Society, and if sustained, on a motion to refer the same to the Board of Direction, by an affirmative vote of not less than twenty-five Corporate Members, it shall be so referred.

The Board of Direction shall then consider the same and report its recommendations to the Society at the next general business meeting, together with a statement of the arguments for and against the appointment of such Committee.

If a motion for the issue of a letter-ballot thereon receive the affirmative vote of two-thirds of the Corporate Members present, the Board of Direction shall, within thirty days thereafter, issue the letter-ballot, accompanied by a statement of the arguments for and against the proposition.

A majority of a total vote of not less than one-third of the Corporate Membership of the Society shall be necessary for its adoption, whereupon the Committee so authorized shall be appointed by the Board of Direction.

ARTICLE VII.—Nomination and Election of Officers.

1.—The Board of Direction shall, from time to time, divide the territory occupied by the membership into seven geographical districts, to be designated by numbers. District No. 1 shall be the territory within fifty miles of the Post Office in the City of New York. Each of the other six districts shall be, as nearly as practicable, contiguous territory; each shall contain, as nearly as practicable, an equal number of members, and they shall be designated as Districts Nos. 2, 3, 4, 5, 6 and 7. The Board shall announce such division to the Society on or before the first day of May in each year.

2.—At the Annual Meeting of each year, seven Corporate Members, not officers of the Society, one from each of the geographical districts, shall be appointed by the meeting to serve for two years; who, with the five living last Past-Presidents of the Society, shall be a committee to nominate officers for the Society.

The Board of Direction may prescribe the mode of procedure for appointing this Committee.

The Committee so appointed shall meet at the Annual Convention of the Society, and nominate candidates to fill the offices, named in Article V, so as to provide, with the officers holding over, a Vice-President and six Directors residing in District No. 1, and twelve Directors divided equally, with regard to number and residence, among the remaining districts, Nos. 2, 3, 4, 5, 6 and 7.

A list of nominees for the offices to be filled at the next Annual Election shall be presented by the Committee to the Board of Direction within ten days after the nominees have been selected.

3.—Directly after the first of October the aforesaid list of nominees shall be mailed to every Corporate Member whose address is known, provided that if any person shall be found by the Board of Direction to be ineligible for the office for which he is nominated, or should a nominee decline such nomination, his name shall not be sent out, but the Board shall substitute another name therefor. The Board shall also fill any vacancies that may occur in this list of nominees up to the time the ballots are sent out. Vacancies must be so filled as to preserve the geographical distribution of officers prescribed in Section 2 of this article.

4.—At any time before the first day of December, any ten or more Corporate Members may send to the Secretary additional nominations, signed by such members; but nominations so made must comply with Section 2 of this article, regarding the distribution of nominees among the several districts.

5.—At least thirty days before the Annual Meeting, there shall be mailed to every Corporate Member whose address is known a letter-ballot with envelopes for voting. This ballot shall include all the nominations made in accordance with this article. The names and residences of the nominees, their grades of membership, and, in the case of nominees for Directors, the number of the district in which they reside, shall be given. The names of the nominees for any one office shall be arranged alphabetically without distinguishing marks of any kind other than the designations named herein.

Voters may erase names from the printed ballot-list and may substitute the name or names of any other person or persons eligible for any office. But the number of names for each office on the ballot voted must not exceed the number to be elected at that time to such office, and the vote must be for the proper number of officers resident in each of the seven districts. Ballots not complying with these provisions shall be rejected.

Directions in accordance with these provisions shall be issued with the ballots.

6.—Ballots may be sent by mail to the Secretary, or may be presented to him at the Society House. They must be enclosed in two sealed envelopes, and the outer envelope shall be endorsed by the voter's signature.

The Secretary shall make from the signatures on the outer envelopes a list of the voters from whom ballots are received, which list shall be open to inspection by all Corporate Members. A voter may withdraw his ballot, and may substitute another, at any time before the polls close.

7.—The polls shall be closed at 12 o'clock noon on the first day of the Annual Meeting, and the ballots shall be canvassed publicly by tellers, who shall be appointed by the presiding officer.

The persons of each district who shall receive the highest number of votes for the office for which they are candidates shall be declared elected.

In case of a tie between two or more candidates for the same office, the Annual Meeting shall elect the officer from among the candidates so tied.

The presiding officer shall announce to the meeting the names of the officers elected, in accordance with this section.

ARTICLE VIII.—MEETINGS.

1.—A Convention of the Society for the reading and discussion of professional papers and for social intercourse shall be held annually at such time and place as the Society may determine.

2.—There shall be two general Business Meetings of the Society each year; the Annual Meeting, which shall be held at the offices of the Society on the third Wednesday in January, and at which the annual reports for the year ending December 31st previous shall be presented, and the ballot for officers canvassed; and a Business Meeting during the Annual Convention, which shall be held at a time and place to be determined by the Board of Direction.

At these meetings thirty Corporate Members shall constitute a quorum.

3. Business Meetings shall be held monthly on the first Wednesday of each month, except during the months of July and August. At these meetings thirty Corporate Members shall constitute a quorum.

4.—In addition to the Annual Meeting and the Annual Convention, meetings for the reading and discussion of papers shall be held as ordered by the Board of Direction.

5.—Special meetings may be called by the Board of Direction, and shall be so called on the request of thirty Corporate Members, which request shall state the purpose of such meeting. The call for such meetings shall be issued ten days in advance, and shall state the purpose thereof, and no other business shall be taken up at such meeting. At these meetings thirty Corporate Members shall constitute a quorum.

6.—The Society may adopt, from time to time, rules for the order of business at its meetings.

7.—Meetings of the Board of Direction shall be held at the time of the Annual Meeting and of the Annual Convention, at which meeting nine members shall constitute a quorum; and at such other times as the Board may determine, at which five members shall constitute a quorum.

ARTICLE IX.—AMENDMENTS.

1.—Proposed amendments to this Constitution must be reduced to writing and signed by not less than five Corporate Members, and be submitted and acted upon as follows:

2.—Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in March.

3.—Amendments presented to the Secretary not less than sixty days previous to the date of the Annual Convention shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and, if so amended, shall be voted upon by letter-ballot in form as amended by said Business Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in October.

4.—If, after discussion of a proposed amendment, at either of the general meetings of the Society, the meeting shall so decide by a majority vote, it may refer the amendment to a Committee for further consideration, which Committee shall report at the next general meeting, whereupon the amendment shall be voted upon as hereinbefore provided.

5.—An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

Amendments so adopted shall take effect thirty days after their adoption, provided that the officers of the Society, at the time any amendment may be adopted, shall continue in office until the next Annual Election.

GENERAL INFORMATION.

Meetings.—Regular meetings are held at the House of the Society, No. 220 West Fifty-seventh Street, New York, on the first and third Wednesdays of each month, at 8.30 p. m., except during the summer. The Annual Meeting is held on the third Wednesday in January. A Convention is held annually, at a time and place determined each year by the Society.

The House and Library of the Society are open from 9 a. m. to 10 p. m. every day, except Sundays, Fourth of July, Thanksgiving Day and Christmas Day.

Publications.—The Society issues two publications, *Proceedings* and *Transactions*, which are furnished without extra charge to members of every grade. Subscription price per annum is for *Proceedings*, $6; for *Transactions*, $10. Discount to libraries, book dealers, etc., 25 per cent.

Ten numbers of *Proceedings* are issued during the year, the numbers appearing on the fourth Wednesday of each month except June and July. Each number contains minutes of meetings, announcements of matters of current interest, a classified list of current engineering articles, and a list of new books received in the Library. Papers to be subsequently presented, as well as discussions to which they give rise, are also published in *Proceedings*.

The papers with complete discussions are subsequently republished in the volumes of *Transactions*, which for some years have been issued semi-annually. Each volume contains about 600 pages, and is bound in paper covers ; arrangements have also been made for furnishing these volumes bound in standard cloth (50 cents), or half morocco ($1.00), to members or subscribers who desire to pay for them in that form.

Professional Papers.—Papers and discussions on subjects of engineering interest are invited by the Board of Direction from all persons, whether members of the Society or not, subject to proper editorial supervision. Under the Constitution, matter which may be readily found elsewhere, advocates personal interests, is carelessly prepared, controverts established facts, or is purely speculative or foreign to the purposes of the Society, must be excluded.

All papers, on their acceptance by the Committee on Publications, become the property of the Society.

GENERAL INFORMATION.

Additions to Library.—It is desirable that copies of books on engineering subjects, and of reports of municipal, railway, canal, water supply and all other public works, be added to the Library. Members of the Society and all who feel an interest in the proper maintenance of a technical reference library, are asked to donate engineering books or reports.

Admission to Membership.—The requirements for each of the grades of membership may be found on pages 5 and 6.

For blank forms and other information, address the Secretary, at the Society House.

Fees and Dues.	Resident.				Non-Resident.			
	Members.	Associate Members.	Associates.	Juniors.	Members.	Associate Members.	Associates.	Juniors.
Entrance Fee	$30.00	$25.00	$20.00	$10.00	$30.00	$25.00	$20.00	$10.00
Yearly Assessment	25.00	25.00	15.00	15.00	15.00	15.00	10.00	10.00
Total, payable upon Election	$55.00	$50.00	$35.00	$25.00	$45.00	$40.00	$30.00	$20.00

Fellowship fee, $250 in one payment for life.

Annual dues are payable in advance on the 1st day of January.

Members elected during the last half of the year pay only one-half of the amount of dues for that year.

Compounding Dues.—The annual dues of a Corporate Member may be compounded by a single payment of $250; of an Associate by a payment of $150. Should a compounding Associate be elected to Corporate Membership, an additional payment of $100 is necessary.

All compounding Corporate Members or Associates, who may be or hereafter become Resident, remain liable for the annual payment of the difference between the annual dues of Resident and Non-Resident Corporate Members or Associates; but any Corporate Member may at any time compound for the future payment of all annual dues of every nature and kind by the payment of $75 in addition to the $250 hereinbefore named; and any Associate may at any time compound for the future payment of all annual dues as Associate by the payment of $40 in addition to the $150 hereinbefore named.

Any person compounding his dues must have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum can be accepted.

Persons compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged ; and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

GENERAL INFORMATION.

CERTIFICATES OF MEMBERSHIP.—The prices, to cover cost of Certificates, are as follows:

Parchment	$2.25
Parchment Paper	1.25
Plate Paper	1.25

Certificates are not issued to Juniors.

BADGE.—This is of gold and enameled, with the member's name and membership number engraved on the back, and is mounted either as an ordinary pin, a scarf pin, a watch charm, or a button. The price is $6 for either of the first three or $6.50 for the button. Badges can be secured only upon application to the Secretary. They are not issued to Juniors.

REMITTANCES.—All remittances should be made payable to the order of the American Society of Civil Engineers. They should be in drafts on New York, in Postal Money Orders payable at the New York Post-Office (not at a branch office), or Express Money Orders.

THE SEVEN GEOGRAPHICAL DISTRICTS INTO WHICH THE TERRITORY OCCUPIED BY THE MEMBERSHIP IS DIVIDED, UNDER ART. VII, SEC. I, OF THE CONSTITUTION.

District No. 1.—The territory within 50 miles of the Post-Office in the City of New York.

District No. 2.—The States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut (except as included in District No. 1), and all countries in Europe.

District No. 3.—The States of New York and New Jersey (except as included in District No. 1), and the Dominion of Canada.

District No. 4.—The States of Pennsylvania, Delaware and Maryland and the District of Columbia.

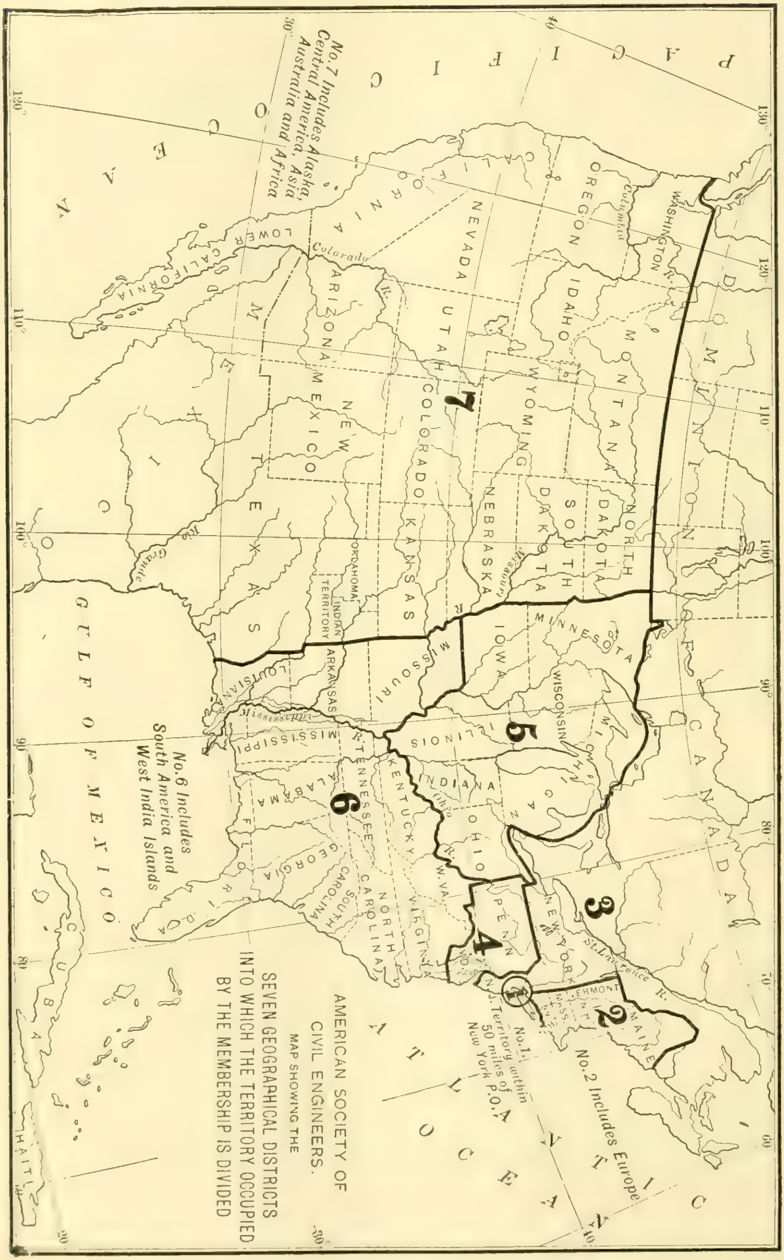
District No. 5.—The States of Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa and Minnesota.

District No. 6.—The States of Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Missouri, Arkansas and Louisiana, the West India Islands, and all countries in South America.

District No. 7.—The States of North Dakota, South Dakota, Nebraska, Kansas, Texas, Montana, Wyoming, Colorado, Idaho, Utah, Washington, Oregon, California and Nevada; the following territories: Indian Territory, Oklahoma, New Mexico, Arizona and Alaska; the Republic of Mexico, and all countries in Central America, Asia, Australasia and Africa.

These Districts are shown on the map on the next page.

GEOGRAPHICAL SUBDIVISIONS.



AMERICAN SOCIETY OF CIVIL ENGINEERS.

MAP SHOWING THE SEVEN GEOGRAPHICAL DISTRICTS INTO WHICH THE TERRITORY OCCUPIED BY THE MEMBERSHIP IS DIVIDED

MEDALS AND PRIZES.

RULES GOVERNING THE AWARD OF THE NORMAN MEDAL, THE THOMAS FITCH ROWLAND PRIZE AND THE COLLINGWOOD PRIZE.

Prizes.

There are at present three endowed prizes for papers published in the *Transactions* of the American Society of Civil Engineers. These prizes are awarded annually.

With the assent and the approval of the donors, by action of the Board of Direction, June 1st, 1897, the Society assumes the responsibility for the payment in perpetuity of the Norman Medal, Thomas Fitch Rowland Prize and Collingwood Prize.

Committee on Prizes.

1. The Board of Direction shall appoint annually, not later than its regular meeting in June of each year, three Corporate Members of the Society, not members of the Board of Direction, who shall form a Committee to recommend the award of all prizes during the year.

2. The papers considered shall include all papers published in the *Transactions* during the year ending with the month of July.

3. The Committee on Prizes shall report its recommendation to the Board of Direction on or before December 31st, and the awards shall be made by the Board of Direction.

4. The announcement of the awards shall be made at the Annual Meeting.

5. The Secretary of the Society shall act as Secretary to the Committee on Prizes, but shall have no vote or voice in its deliberations.

Code of Rules.

The Norman Medal.—The Norman Medal was instituted and endowed in 1874 by the late George H. Norman, M. Am. Soc. C. E.

I. Competition for the Norman Medal of the American Society of Civil Engineers shall be restricted to members of the Society.

II. There shall be one gold medal awarded as hereinafter provided. The dies therefor shall be deposited with the Superintendent of the United States Mint at Philadelphia, in trust exclusively for the above purpose. Such medal shall be of a value of $60.

III. All original papers presented to the Society by members of any class, and published in the *Transactions* during the year for which the medal is awarded, shall be open to the award, provided that such papers shall not have been previously contributed in whole or in part to any other association, nor have appeared in print prior to their publication by the Society, nor have been published in the *Transactions* in any previous year.

IV. The medal shall be awarded to a paper which shall be judged worthy of special commendation for its merit as a contribution to engineering science.

MEDALS AND PRIZES.

The Thomas Fitch Rowland Prize.—The Thomas Fitch Rowland Prize was originally instituted by the Society at the Annual Meeting of 1882. It was endowed in 1884 by Thomas Fitch Rowland, Hon. M. Am. Soc. C. E. Its award is not restricted to members of the Society.

I. The prize shall consist of $60 in cash, with an engraved certificate signed by the President and Secretary of the Society.

II. In the award of this prize preference shall be given to papers describing in detail accomplished works of construction, their cost and errors in design and execution.

The Collingwood Prize for Juniors.—The Collingwood Prize for Juniors was instituted and endowed in 1894 by Francis Collingwood, M. Am. Soc. C. E.

I. The competition for the prize shall be restricted to the Juniors of the Society.

II. The prize shall consist of $50 in cash, with an engraved certificate, signed by the President and the Secretary of the Society.

III. The prize shall be awarded to a paper describing an engineering work with which the writer has been directly connected, or it shall record investigations contributing to engineering knowledge, some essential part of which was made by the writer, and contain a rational digest of results. Any mathematical treatment must show immediate adaptability to professional practice. Accuracy of language and excellence of style will be factors in the award.

IV. These rules may be modified by the Board of Direction.

The awards of the Norman Medal, the Thomas Fitch Rowland Prize, and the Collingwood Prize are indicated in the List of Members by the letters N., R. and C., respectively, prefixed to the name of each recipient.

AWARDS OF THE NORMAN MEDAL.

1874. J. James R. Croes, for paper "Memoir of the Construction of a Masonry Dam." Vol. III,* p. 337.

1875. Theodore G. Ellis, for paper "Description and Results of Hydraulic Experiments with Large Apertures, at Holyoke, Mass., in 1874." Vol. V,* p. 19.

1877. William W. Maclay, for paper "Notes and Experiments on the Use and Testing of Portland Cement." Vol. VI,* p. 311.
Book Prize awarded to Julius H. Striedinger, for paper "On Igniting Blasts by Means of Electricity." Vol. VII,* p. 1.

1879. Edward P. North, for paper "The Construction and Maintenance of Roads." Vol. VIII,* p. 95.
Book Prize awarded to Max E. Schmidt, for paper "Notes on the South Pass Jetties." Vol. VIII,* p. 189.

1880. Theodore Cooper, for paper "The Use of Steel for Bridges." Vol. VIII,* p. 263.

1881. L. L. Buck, for paper "The Re-Enforcement of the Anchorage and Renewal of the Suspended Superstructure of the Niagara Railroad Suspension Bridge." Vol. X,* p. 195.

1882. A. Fteley and F. P. Stearns, for paper "Description of Some Experiments on the Flow of Water Made during the Construction of Works for Conveying the Water of Sudbury River to Boston." Vol. XII,* p. 1.

1883. William P. Shinn, for papers "On the Increased Efficiency of Railways for the Transportation of Freight." Vol. XI,* p. 365; and "How can Railways be made more Efficient in the Transportation of Freight?" Vol. XII,* p. 189.

1884. James Christie, for paper "Experiments on the Strength of Wrought-Iron Struts." Vol. XIII,* p. 85.

1885. Eliot C. Clarke, for paper "Record of Tests of Cement Made for Boston Main Drainage Works." Vol. XIV,* p. 141.

1886. Edward Bates Dorsey, for paper "English and American Railroads Compared." Vol. XV,* p. 1.

1887. Desmond FitzGerald, for paper "Evaporation." Vol. XV,* p. 581.

1888. E. E. Russell Tratman, for paper "English Railroad Track." Vol. XVIII,* p. 217.

1889. Theodore Cooper, for paper "American Railroad Bridges." Vol. XXI,* p. 1.

1890. John R. Freeman, for paper "Experiments Relating to the Hydraulics of Fire Streams." Vol. XXI,* p. 303.

1891. John R. Freeman, for paper "The Nozzle as an Accurate Water Meter." Vol. XXIV,* p. 492.

1892. William Starling, for paper "Some Notes on the Holland Dikes." Vol. XXVI,* p. 559.

1893. Desmond FitzGerald, for paper "Rainfall, Flow of Streams, and Storage." Vol. XXVII,* p. 253.

1894. Alfred E. Hunt, for paper "A Proposed Method of Testing Structural Steel." Vol. XXX,* p. 181.

1895. William Ham. Hall, for paper "The Santa Ana Canal of the Bear Valley Irrigation Company." Vol. XXXIII,* p. 61.

1896. John E. Greiner, for paper "What is the Life of an Iron Railroad Bridge?" Vol. XXXIV,* p. 294.

1897. Julius Baier, for paper "Wind Pressures in the St. Louis Tornado, with Special Reference to the Necessity of Wind Bracing for High Buildings." Vol. XXXVII,* p. 221.

1898. B. F. Thomas, for paper "Movable Dams." Vol. XXXIX,* p. 431.

1899. E. Herbert Stone, for paper "The Determination of the Safe Working Stress for Railway Bridges of Wrought Iron and Steel." Vol. XLI,* p. 467.

1900. James A. Seddon, for paper "River Hydraulics." Vol. XLIII,* p. 179.

1902. Gardner S. Williams, Clarence W. Hubbell and George H. Fenkell, for paper "Experiments at Detroit, Mich., on the effect of Curvature upon the Flow of Water in Pipes." Vol. XLVII,* p. 1.

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* *Transactions*, Am. Soc. C. E.

MEDALS AND PRIZES.

AWARDS OF THE THOMAS FITCH ROWLAND PRIZE.*

1883. G. Lindenthal, for paper "Rebuilding the Monongahela Bridge, at Pittsburgh, Pa." Vol. XII,† p. 353.
1884. Hamilton Smith, Jr., for paper "Water Power with High Pressures and Wrought-Iron Water Pipe." Vol. XIII,† p. 15.
1885. A. M. Wellington, for paper "Experiments with New Apparatus on Journal Friction at Low Velocities." Vol. XIII,† p. 409.
1886. Charles C. Schneider, for paper "The Cantilever Bridge at Niagara Falls." Vol. XIV,† p. 499.
1887. William Metcalf, for paper "Steel: Its Properties; Its Use in Structures and in Heavy Guns." Vol. XVI,† p. 283.
1888. Clemens Herschel, for paper "The Venturi Water Meter: An Instrument Making Use of a New Method of Gauging Water; Applicable to the Cases of Very Large Tubes, and of a Small Value Only, of the Liquid to be Gauged." Vol. XVII,† p. 228.
1889. James D. Schuyler, for paper "The Construction of the Sweetwater Dam." Vol. XIX,† p. 201.
1890. O. Chanute, John F. Wallace and William H. Breithaupt, for paper "The Sibley Bridge." Vol. XXI,† p. 97.
1891. William H. Burr, for paper "The River Spans of the Cincinnati and Covington Elevated Railway, Transfer and Bridge Company." Vol. XXIII,† p. 47.
1892. Samuel M. Rowe, Stillman W. Robinson and Henry H. Quimby, for paper "Red Rock Cantilever Bridge." Vol. XXV,† p. 662.
1893. William Murray Black, for paper "The Improvement of Harbors on the South Atlantic Coast of the United States." Vol. XXIX,† p. 223.
1894. David L. Barnes, for paper "Distinctive Features and Advantages of American Locomotive Practice." Vol. XXIX,† p. 385.
1895. William R. Hill, for paper "The Water-Works of Syracuse, N. Y." Vol. XXXIV,† p. 23.
1896. H. St. L. Coppée, for paper "Bank Revetment on the Lower Mississippi." Vol. XXXV,† p. 141.
1897. Arthur L. Adams, for paper "The Astoria (Oregon) City Water-Works." Vol. XXXVI,† p. 1.
1898. Henry Goldmark, for paper "The Power Plant, Pipe Line and Dam of the Pioneer Electric Power Company at Ogden, Utah." Vol. XXXVIII,† p. 246.
1899. R. S. Buck, for paper "The Niagara Railway Arch." Vol. XL,† p. 125.
1900. Allen Hazen, for paper "The Albany Water Filtration Plant." Vol. XLIII,† p. 244.
1901. L. G. Montony, for paper "The Ninety-Sixth Street Power Station of the Metropolitan Street Railway Company, of New York City." Vol. XLIV,† p. 119.
1902. William W. Harts, for paper "Description of Coos Bay, Oregon, and the Improvement of Its Entrance by the Government." Vol. XLVI,† p. 482.
1903. George W. Fuller, for paper "The Filtration Works of the East Jersey Water Company, at Little Falls, New Jersey." Vol. L,† p. 394.

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* This prize was known as the Rowland Prize from 1883 to 1896 and consisted of $50. Beginning with the award for 1897 it is to be known as the Thomas Fitch Rowland Prize and consists of $60, with an engraved certificate signed by the President and Secretary of the Society.

† *Transactions*, Am. Soc. C. E.

AWARDS OF THE COLLINGWOOD PRIZE FOR JUNIORS.

1895. Morton L. Byers, for paper "The Renewal of the Channel Pier of the Cincinnati and Muskingum Valley Railway Bridge over the Scioto River." Vol. XXXI,† p. 361.

1896. Herbert Waldo York, for paper "The Twenty-Eighth Street Central Station of the United Electric Light and Power Company." Vol. XXXV,† p. 429.

1899. Julius Kahn, for paper "The Coal Hoists of the Calumet and Hecla Mining Company." Vol. XLI,† p. 269.

1900. Robert P. Woods, for paper "Street Grades and Cross-Sections in Asphalt and Cement." Vol. XLII,† p. 1.

1901. F. A. Kummer, for paper "A Proposed Method for the Preservation of Timber." Vol. XLV,† p. 181.

1903. Isaac Harby, for paper "The Footbridge for Building the Cables of the New East River Bridge." Vol. XLIX,† p. 165.

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† *Transactions*, Am. Soc. C. E.

LOCATION AND DATE
OF
ANNUAL CONVENTIONS.

Number.	Location.	Date.
First,	New York, N. Y.,	June, 1869
Second,	New York, N. Y.,	June, 1870
Third,	New York, N. Y.,	June, 1871
Fourth,	Chicago, Ill.,	June, 1872
Fifth,	Louisville, Ky.,	May, 1873
Sixth,	New York, N. Y.,	June, 1874
Seventh,	Pittsburg, Pa.,	June, 1875
Eighth,	Philadelphia, Pa.,	June, 1876
Ninth,	New Orleans, La.,	April, 1877
Tenth,	Boston, Mass.,	June, 1878
Eleventh,	Cleveland, Ohio,	June, 1879
Twelfth,	St. Louis, Mo.,	May, 1880
Thirteenth,	Montreal, Que., Canada,	June, 1881
Fourteenth,	Washington, D. C.,	May, 1882
Fifteenth,	St. Paul and Minneapolis, Minn.,	June, 1883
Sixteenth,	Buffalo, N. Y.,	June, 1884
Seventeenth,	Deer Park, Md.,	June, 1885
Eighteenth,	Denver, Colo.,	July, 1886
Nineteenth,	Hotel Kaaterskill, N. Y.,	July, 1887
Twentieth,	Milwaukee, Wis.,	June, 1888
Twenty-first,	Seabright, N. J.,	June, 1889
Twenty-second,	Cresson, Pa.,	June, 1890
Twenty-third,	Lookout Mountain, Tenn.,	May, 1891
Twenty-fourth,	Old Point Comfort, Va.,	June, 1892
Twenty-fifth,	Chicago, Ill.,	July, 1893
Twenty-sixth,	Niagara Falls, N. Y.,	June, 1894
Twenty-seventh,	Hotel Pemberton, Hull, Mass.,	June, 1895
Twenty-eighth,	San Francisco, Cal.,	June, 1896
Twenty-ninth,	Quebec, Que., Canada,	June, 1897
Thirtieth,	Detroit, Mich.,	July, 1898
Thirty-first,	Cape May, N. J.,	June, 1899
Thirty-second,	London, England,	July, 1900
Thirty-third,	Niagara Falls, N. Y.,	June, 1901
Thirty-fourth,	Washington, D. C.,	May, 1902
Thirty-fifth,	Asheville, N. C.,	June, 1903

LIST OF MEMBERS.

AUTHORIZED ABBREVIATIONS.

HONORARY MEMBER	Hon. M. Am. Soc. C. E.
MEMBER	M. Am. Soc. C. E.
ASSOCIATE MEMBER	Assoc. M. Am. Soc. C. E.
ASSOCIATE	Assoc. Am. Soc. C. E.
JUNIOR	Jun. Am. Soc. C. E.
FELLOW	F. Am. Soc. C. E.

The Board of Direction requests the use of these abbreviations in all cases.

The awards of the Norman Medal, the Thomas Fitch Rowland Prize, and the Collingwood Prize, are indicated in this list by the letters N., R. and C., respectively, prefixed to the name of each recipient.

It is particularly requested that every
change of address
be communicated immediately to:
The Secretary, American Society of Civil Engineers,
220 West Fifty-seventh Street,
New York, N. Y.

PAST-PRESIDENTS.

James Laurie	Nov. 5, 1852, to Nov. 6, 1867.
James Pugh Kirkwood	Nov. 6, 1867, to Aug. 5, 1868.
William Jarvis McAlpine	Aug. 5, 1868, to Nov. 3, 1869.
Alfred Wingate Craven	Nov. 3, 1869, to Nov. 1, 1871.
Horatio Allen	Nov. 1, 1871, to Nov. 5, 1873.
Julius Walker Adams	Nov. 5, 1873, to Nov. 3, 1875.
George Sears Greene	Nov. 3, 1875, to Nov. 7, 1877.
Ellis Sylvester Chesbrough	Nov. 7, 1877, to Nov. 6, 1878.
William Milnor Roberts	Nov. 6, 1878, to Nov. 5, 1879.
Albert Fink	Nov. 5, 1879, to Nov. 3, 1880.
James Bicheno Francis	Nov. 3, 1880, to Jan. 18, 1882.
Ashbel Welch	Jan. 18, 1882, to Sept. 25, 1882.*
CHARLES PAINE	Jan. 17, 1883, to Jan. 16, 1884.
DON JUAN WHITTEMORE	Jan. 16, 1884, to Jan. 21, 1885.
Frederic Graff	Jan. 21, 1885, to Jan. 20, 1886.
Henry Flad	Jan. 20, 1886, to Jan. 19, 1887.
William Ezra Worthen	Jan. 19, 1887, to Jan. 18, 1888.
THOMAS COLTRIN KEEFER	Jan. 18, 1888, to Jan. 16, 1889.
Max Joseph Becker	Jan. 16, 1889, to Jan. 15, 1890.
William Powell Shinn	Jan. 15, 1890, to Jan. 21, 1891.
OCTAVE CHANUTE	Jan. 21, 1891, to Jan. 20, 1892.
MENDES COHEN	Jan. 20, 1892, to Jan. 18, 1893.
WILLIAM METCALF	Jan. 18, 1893, to Jan. 17, 1894.
WILLIAM PRICE CRAIGHILL	Jan. 17, 1894, to Jan. 16, 1895.
George Shattuck Morison	Jan. 16, 1895, to Jan. 15, 1896.
Thomas Curtis Clarke	Jan. 15, 1896, to Jan. 20, 1897.
BENJAMIN MORGAN HARROD	Jan. 20, 1897, to Jan. 19, 1898.
Alphonse Fteley	Jan. 19, 1898, to Jan. 18, 1899.
DESMOND FITZGERALD	Jan. 18, 1899, to Jan. 17, 1900.
JOHN FINDLEY WALLACE	Jan. 17, 1900, to Jan. 16, 1901.
JOHN JAMES ROBERTSON CROES	Jan. 16, 1901, to Jan. 15, 1902.
ROBERT MOORE	Jan. 15, 1902, to Jan. 21, 1903.
ALFRED NOBLE	Jan. 21, 1903, to Jan. 20, 1904.

In this list, the names of deceased Past-Presidents are printed in italics.

* Mr. Ashbel Welch died September 25, 1882, during his term of office as President.

OFFICERS, 1904.

PRESIDENT

CHARLES HERMANY.

VICE-PRESIDENTS

Term expires January, 1905

L. F. G. BOUSCAREN, JAMES D. SCHUYLER,

Term expires January, 1906

F. S. CURTIS, S. L. F. DEYO.

SECRETARY

CHARLES WARREN HUNT.

TREASURER

JOSEPH M. KNAP.

DIRECTORS

Term expires January, 1905

RICHARD S. BUCK, GEORGE H. PEGRAM, WILLIAM J. WILGUS, WILLIAM JACKSON, EDMUND F. VAN HOESEN, JAMES L. FRAZIER.

Term expires January, 1906

ALFRED CRAVEN, JOSEPH O. OSGOOD, GEORGE S. DAVISON, E. C. LEWIS, HUNTER McDONALD, ELWOOD MEAD.

Term expires January, 1907

CHARLES S. GOWEN, NELSON P. LEWIS, JOHN W. ELLIS, GEORGE S. WEBSTER, RALPH MODJESKI, CHARLES D. MARX.

PAST-PRESIDENTS

(Members of the Board)

DESMOND FITZGERALD, JOHN F. WALLACE, J. JAMES R. CROES, ROBERT MOORE, ALFRED NOBLE.

ASSISTANT SECRETARY

THOMAS J. McMINN.

Standing Committees of the Board of Direction.

The President is *ex officio* a member of all committees.

On Finance:

S. L. F. DEYO,

L. F. G. BOUSCAREN,
RICHARD S. BUCK,
WILLIAM J. WILGUS,
CHARLES S. GOWEN.

On Publications:

GEORGE H. PEGRAM,

ALFRED CRAVEN,
JOSEPH O. OSGOOD,
GEORGE S. DAVISON,
HUNTER McDONALD.

On Library:

NELSON P. LEWIS,

WILLIAM JACKSON,
E. C. LEWIS,
RALPH MODJESKI,
CHARLES WARREN HUNT.

Special Committees.

On Uniform Tests of Cement:

GEORGE S. WEBSTER,

RICHARD L. HUMPHREY,
GEORGE F. SWAIN,
ALFRED NOBLE,
LOUIS C. SABIN,
S. B. NEWBERRY,
CLIFFORD RICHARDSON,
W. B. W. HOWE,
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On Rail Sections:

L. F. G. BOUSCAREN,
C. W. BUCHHOLZ,
S. M. FELTON,
ROBERT W. HUNT,
JOHN D. ISAACS,
RICHARD MONTFORT,
H. G. PROUT,
JOSEPH T. RICHARDS,
PERCIVAL ROBERTS, Jr.
GEORGE E. THACKRAY,
EDMUND K. TURNER,
WILLIAM R. WEBSTER.

CLASSIFIED LIST.

HONORARY MEMBERS.

[Hon. M. Am. Soc. C. E.]

		Date of Membership.
Baker, *Sir* Benjamin. 2 Queen Square Pl., Queen Anne's Mansions, Westminster, London, S. W., England		May 5, 1897
CRAIGHILL, WILLIAM PRICE. (*Past-President*). Retired Chf. of Engrs. and Brig.-Gen., U. S. A., Charlestown, Jefferson Co., W. Va.	M. Hon. M.	Oct. 7, 1885 Mar. 23, 1896
Davidson, George. Prof. of Geography, Univ. of California, San Francisco, Cal		May 5, 1897
Fox, *Sir* Douglas. 28 Victoria St., Westminster, London, England	Cor. M. Hon. M.	June 7, 1871 Mar. 5, 1901
Fritz, John. Bethlehem, Pa.	M. Hon. M.	July 5, 1893 Sept. 5, 1899
Gray, George Edward. 1155 Bush St., San Francisco, Cal	M. Hon. M.	July 2, 1873 June 5, 1894
Melville, George Wallace. Rear-Admiral, U. S. N. (*Retired*), Dooner's Hotel, Tenth St., Philadelphia, Pa.		Dec. 20, 1899
Rowland, Thomas Fitch. Pres., The Continental Iron Works, Brooklyn, N. Y. (Res., 329 Madison Ave., New York City)	M. Hon. M.	Dec. 4, 1867 Dec. 20, 1899
Storrow, Charles Storer. 192 Beacon St., Boston, Mass		Jan. 24, 1893

Honorary Members, 9.

CORRESPONDING MEMBERS.

	Date of Membership.
Gleim, Charles Otto. Civ. and Cons. Engr., 184 Dorotheen-Strasse, Hamburg-Winterhude, Germany	April 5, 1876
Pontzen, Ernest. Civ. and Cons. Engr., 65 Rue Monceau, Paris, France	Jan. 5, 1876

Corresponding Members, 2.

MEMBERS.

[M. Am. Soc. C. E.]

		Date of Membership.
Abbot, Frederic Vaughan. Maj., Corps of Engrs., U. S. A., Room 122, State, War and Navy Bldg., Washington, D. C.		Dec. 3, 1884
Abbot, Frederick William. Pres., Abbot-Gamble Contr. Co., 32 Broadway (Res., 220 West 59th St.), New York City	Assoc. M. M.	Oct. 7, 1891 April 1, 1896
Abbott, Arthur Vaughan. 8 Bridge St., New York City	Jun. M.	Jan. 5, 1881 Dec. 4, 1901
Adam, Robert. Puente de Alverado No. 15, City of Mexico, Mexico		May 2, 1900
Adams, Arthur Lincoln. Hydr. Engr., 37 Crocker Bldg., San Francisco, Cal.		Oct. 2, 1895
Adgate, George. Western Mgr. of Foundation & Contr. Co., 1816 North 18th St., Omaha, Nebr.		April 1, 1896
Aertsen, Guilliaem. Gen. Mgr., Latrobe Steel Co., 1200 Girard Bldg., Philadelphia, Pa.		Oct. 1, 1890
Africa, James Murray. City Engr., Huntingdon, Pa.; City Engr., Lewistown, Pa.		Sept. 2, 1896
Aiken, William Augustin. Gen. Insp. of Material, Rapid Transit R. R. Commrs., City of New York, 613 Empire Bldg., Pittsburg, Pa.		Oct. 2, 1889
Ainsworth, Danforth Hurlbut. 1240 West 10th St., Des Moines, Iowa		Mar. 3, 1886
Albertson, Charles. Asst. Mgr., and Mgr., Eng. Dept., The Am. Trading Co., 99 Kitamachi, Kobe, Japan	Jun. Assoc. M. M.	Oct. 1, 1895 Mar. 1, 1899 Oct. 7, 1903
Alden, John Ferris. Cons. Engr., Rochester, N. Y.		July 6, 1887
Alderman, Charles Aldo. Interurban Union Station, Columbus, Ohio	Assoc. M. M.	April 6, 1898 April 2, 1902
Aldrich, Truman Heminway. Birmingham, Ala.		May 4, 1881
Alfred, Frank Hooker. Chf. Engr., Pere Marquette R. R., Detroit, Mich.		June 3, 1903
Allan, Percy. Public Works Dept., Sydney, New South Wales, Australia	Assoc. M. M.	April 1, 1896 Oct. 1, 1902
Allen, C. Frank. Prof. of R. R. Eng., Mass. Inst. Tech., Boston, Mass.		Feb. 6, 1878
Allen, Calvin Harlow. 1 West 72d St., New York City		Sept. 7, 1887
Allen, Charles Albert. Cons. Engr., Worcester, Mass.		June 4, 1879
Allen, James Pierson. 8 Ladson St., Charleston, S. C.	Jun. M.	Mar. 5, 1879 June 4, 1884

		Date of Membership
Allen, Kenneth. Engr. and Supt. of Water Dept., City Hall, Atlantic City, N. J.		May 2, 1888
Alvord, John Watson. 127 Hartford Bldg., Chicago, Ill.		Jan. 4, 1893
Ambrose, William Creelman. Asst. Engr., Western Pacific Ry., 2604 Dana St., Berkeley, Cal.		April 4, 1888
Amweg, Frederick James. Engr. and Mgr., Am.-Hawaiian Eng. & Constr. Co., Ltd., 218 Rialto Bldg., San Francisco, Cal.		Mar. 7, 1888
Andersen, Christian. Asst. Engr., U. S. Geological Survey, Spokane, Wash.		Jan. 2, 1901
Anderson, Latham. Kuttawa, Lyon Co., Ky.		May 2, 1888
Andrews, Daniel Marshall. U. S. Asst. Engr., Care, U. S. Engr. Office, Montgomery, Ala.		Mar. 2, 1892
Andrews, David Herbert. Pres., The Boston Bridge Works, Inc.; 38 Lake Ave., Newton Center, Mass.		Sept. 2, 1885
Andrews, Horace. Cons. Engr., 125 Lancaster St., Albany, N. Y.		April 6, 1887
Angier, Walter Eugène. Res. Engr., Thebes Bridge (So. Ill. & Mo. Bridge Co.), Thebes, Ill.	Assoc. M. M.	Sept. 7, 1892 Sept. 3, 1902
Annan, Charles Le Roy. Office Engr., Dept. of Public Works, St. Paul, Minn.		July 4, 1888
Anthony, Charles, Jr. Town Hall, East London, Cape of Good Hope, South Africa.		Mar. 5, 1902
Appleton, Thomas. Supt. of Constr., U. S. Post Office, Holyoke, Mass.		April 4, 1883
Archbald, James. Cons. Engr., 424 Jefferson Ave., Scranton, Pa.		May 15, 1872
Archer, William. Care, Gen. Office, B. & O. S. W. R. R., Cincinnati, Ohio		Mar. 2, 1881
Archibald, Peter Suther. Cons. Engr., Moncton, N. B., Canada.		Jan. 7, 1885
Arentz, Frederick Christian Holberg. Chf. Engr., The Joliet Bridge & Iron Co., 821 Oneida St., Joliet, Ill.	Assoc. M. M.	May 6, 1891 Oct. 3, 1900
Argollo, Miguel de Teive e. Director and Chf. Engr., San Francisco R. R., Alagoinhas, Bahia, Brazil.		Oct. 2, 1895
Armington, James Hervey. Cons. Engr., East Providence, R. I.		July 6, 1870
Artingstall, Samuel George. 13 South Hamilton Ave., Chicago, Ill.		Oct. 6, 1886
Ashmead, Frank Milligan. Engr., R. of W., B. & A. V. Div., P. R. R., 98 Johnson Park, Buffalo, N. Y.		July 6, 1887
Aspinwall, Thomas. 3 Hamilton Pl., Boston, Mass.		May 2, 1888
Asserson, Henry Raymond. Chf. Engr. of Sewers, Borough of Brooklyn, Room 44, Municipal Bldg., Brooklyn (Res., Floral Park), N. Y.		Oct. 2, 1901
Asserson, Peter Christian. Rear-Admiral and Civ. Engr., U. S. N. (*Retired*), 1314 Connecticut Ave., Washington, D. C.		July 5, 1882
Atkinson, John Bond. Pres., St. Bernard Min. Co., Earlington, Ky.		Sept. 5, 1877
Atwater, Almon Byron. Asst. to the Pres., Grand Trunk Ry. System, Lines West of Detroit & St. Clair Rivers, Detroit, Mich.		May 5, 1886
Atwood, John Abiel. Chf. Engr., P. & L. E. R. R., Pittsburg, Pa.		Jan. 3, 1900
Auchincloss, William S. Atlantic Highlands, N. J.		Feb. 17, 1869

		Date of Membership.
Aus, Gunvald. Cons. Engr., 79 Wall St., New York City		April 3, 1895
Averill, Frank Lloyd. Structural Engr., Office of Superv. Archt., Treasury Dept., Washington, D. C.	Assoc. M. M.	Jan. 6, 1897 May 6, 1903
Axtell, Decatur. Richmond, Va.		Mar. 3, 1886
Aycrigg, William Anderson. Civ. Engr., with U. P. R. R., Omaha, Nebr.	Assoc. M. M.	May 4, 1892 May 4, 1898
Ayres, Henry Wilcox. 66 State St., Hartford, Conn.		Mar. 5, 1890
Babcock, Henry Nash. U. S. Asst. Engr., Army Bldg., 39 Whitehall St., New York City		Sept. 3, 1884
Bacon, James Hayward. U. S. Asst. Engr., U. S. Engr. Office, Fernandina, Fla.		Jan. 3, 1900
Bacon, John Watson. Danbury, Conn.		July 12, 1877
Bacot, William Sinclair. Engr. and Gen. Mgr., Consolidated Water Co. of Utica, 234 Genesee St., Utica, N. Y.		Oct. 1, 1890
N. Baier, Julius. Mgr., Conrey Placer Min. Co., Ruby, Mont.	Jun. Assoc. M. M.	Sept. 7, 1887 June 1, 1892 Feb. 6, 1901
Bailey, George Irving. Cons. Engr. and Contr., 2023 Boston Rd., New York City		Oct. 1, 1890
Baird, Howard Carter. Prin. Asst. Engr., Phœnix Iron Co., Phœnixville, Pa.	Jun. Assoc. M. M.	Jun. 6, 1893 Oct. 5, 1898 Feb. 2, 1904
Baker, Charles Hinckley. Pres. and Chf. Engr., Snoqualmie Falls Power Co.; Chf. Engr., White River Power Co., Seattle, Wash.		June 4, 1902
Baker, Holland Williams. Kirkwood, Mo.		May 7, 1890
Baker, Ira Osborn. 702 W. University Ave., Champaign, Ill.		May 3, 1893
Baker, William Edgar. 170 Broadway, New York City		June 1, 1898
Balbin, Ernesto Joaquin. Chf. Engr. of the Light House Service of Cuba (Res., Virtudes, 103), Havana, Cuba		Nov. 1, 1893
Baldwin, Fred Hixon. Supt., Bergenport Chemical Works, Bayonne, N. J.		Nov. 5, 1884
Baldwin, Henry Furlong. Chf. Engr., Chic. & Alton Ry., Grand Central Depot, Chicago, Ill.	Assoc. M. M.	Dec. 7, 1892 Feb. 6, 1895
Baldwin, Thomas Williams. Boothbay Harbor, Me.		April 2, 1884
Baldwin, Ward. Cons. Engr., 65 Mitchell Bldg., Cincinnati, Ohio	Jun. M.	Mar. 2, 1881 Oct. 2, 1889
Baldwin, William Henry. Warburton Bldg., Yonkers, N. Y.		June 6, 1888
Baldwin, William James. Cons. Engr., 107 West 17th St., New York City		Sept. 5, 1888
Ball, Charles Backus. 50 Morningside Ave., New York City		Oct. 1, 1890
Ballard, Robert. 35 Wood Lane, Shepherd's Bush, London, W., England		Sept. 1, 1880
Barber, William Davis. Asst. Engr. in Chg., Div. of Constr. and Repairs, 323 City Hall, Chicago, Ill.	Assoc. M. M.	Sept. 1, 1897 Jan. 8, 1902
Barbour, Frank Alexander. (Snow & Barbour, Civ. and San. Engrs.), 1120 Tremont Bldg., Boston, Mass.		Sept. 5, 1900

		Date of Membership.
Barcroft, Frederick Thomas. Cons. Engr. and Archt. (Joy & Barcroft), 407 Ferguson Bldg., Detroit, Mich.		Sept. 3, 1902
Bardol, Frank Valentine Erhard. Engr. and Contr., 400 D. S. Morgan Bldg., Buffalo, N. Y.		May 2, 1900
Barlow, John Quincy. Chf. Engr., West. Md. R. R., Central Station, Cumberland, Md.	Jun. M.	April 7, 1886 July 4, 1888
Barnard, Edward Chester. Chf. Topographer, U. S. and Canada Boundary Survey, Washington, D. C.		Dec. 3, 1902
Barnard, John Fiske. Pres., St. Clair, Madison & St. L. Belt R. R. Co.; Res., 117 South 15th St., St. Joseph, Mo.		Sept. 1, 1880
Barnes, Oliver Weldon. Cons. Engr., Fishkill, Dutchess Co., N. Y.		July 6, 1881
Barnes, Thomas Howard. Civ. and Municipal Engr., 7 Water St., Boston, Mass.		Oct. 4, 1899
Barr, Jacob Neff. Asst. to the Pres., C., M. & St. P. Ry., 415 Old Colony Bldg., Chicago, Ill.		Nov. 7, 1888
Bassel, Robert. Grüner Weg, 49, II, Prenzlau, Germany		May 2, 1888
Bassell, Burr. Res. Engr., Kern River Co., Kernville, Cal.		Nov. 4, 1903
Bassett, Carrol Phillips. Treas., Essex-Union Water & Light Co., Summit, N. J.		Nov. 7, 1888
Bassett, George Barclay. 290 Terrace, Buffalo, N. Y.		Mar. 1, 1893
Bates, Onward. Pres., Bates & Rogers Constr. Co., Manhattan Bldg., Chicago, Ill.		Jan. 4, 1882
Baxter, Frank Edwin. Div. Engr., Rio Grande West. Ry., 1250 East South Temple St., Salt Lake City, Utah.		Oct. 2, 1901
Baxter, George Strong. Railroad and lumber business, 15 William St., New York City	Jun. M.	May 12, 1875 May 3, 1876
Bayliss, Rawlinson Tennant. 11 Cornhill, London, E. C., England.		June 4, 1890
Beach, Robert James. Pres., R. J. Beach Eng. Co., 149 Broadway, New York City		May 2, 1900
Beahan, Willard. Div. Engr., C. & N. W. Ry., Winona, Minn.		April 3, 1889
Beard, Edward James. Prin. Asst. Engr., C., R. I. & P. Ry., 409 Kansas City Life Bldg., Kansas City, Mo.		Feb. 7, 1900
Beardsley, Arthur. Emeritus Prof. of Eng., Swarthmore Coll., Swarthmore, Pa.	Assoc. M.	Sept. 1, 1875 Sept. 2, 1891
Beardsley, James Wallace. Cons. Engr. to the Comm. and Chf. of the Bureau of Eng., Palace, Manila, Philippine Islands.		Dec. 4, 1901
Beckler, Elbridge Harlow. Director in Winston Bros. Co., 1838 Aldine Ave., Chicago, Ill.		April 6, 1892
Beckwith, Frank. Asst. Engr., Engr. Office, L. S. & M. S. Ry., Cleveland, Ohio.		Nov. 7, 1900
Belknap, William Ethelbert. Supt., Communipau Coal Co., Jersey City, N. J.; Address, 25 Fifth Ave., New York City	Jun. Assoc. M. M.	Mar. 31, 1891 Mar. 6, 1895 Dec. 1, 1897
Bell, Alonzo Clarence. Room 304, Pelican Bldg., New Orleans, La.		Mar. 7, 1900
Bell, Andrew. Cons. Engr., Almonte, Ont., Canada.		Sept. 5, 1883
Bell, George Joseph. County Surv. and Bridge Master, The Courts (also 16 Portland Sq.), Carlisle, England.	Assoc. M. M.	Nov. 2, 1898 Oct. 1, 1902

		Date of Membership.
Bell, Gilbert James. Asst. Engr., A., T. & S. F. Ry., 1403 Troost Ave., Kansas City, Mo	Jun. M.	Sept. 7, 1887 Oct. 6, 1897
Bell, Henry Purdon. Victoria, B. C., Canada		June 4, 1884
Bell, James Richard. 47 Victoria St., Westminster, London, S. W., England		Sept. 2, 1896
Bellinger, Lyle Frederick. Civ. Engr., U. S. N., Engr. in Chg., U. S. Naval Station, New Orleans, La		Nov. 6, 1901
Bement, Robert Bunker Coleman. Contr. and Cons. Engr., 506 Endicott Bldg., St. Paul, Minn		Sept. 7, 1887
Bennett, Frederick Wagoner. Chf. Engr., The Cienfuegos, Palmira & Cruces Elec. Power & Ry. Co., Apartado 70, Cienfuegos, Cuba		Oct. 7, 1903
Bensel, John Anderson. Engr. in Chf., Dept. of Docks and Ferries, Pier A, North River, New York City	Jun. M.	Sept. 2, 1885 Mar. 4, 1891
Benson, Orville. Engr., Am. Bridge Co., Pittsburg, Pa		June 5, 1901
Bent, Cornelius Conway Felton. Care, B. & O. R. R. Co., 24th and Chestnut Sts., Philadelphia, Pa		May 1, 1889
Benzenberg, George Henry. Cons. Engr., Milwaukee, Wis		May 2, 1883
Berg, Louis De Coppet. Archt., 6 West 22d St., New York City	Assoc. M.	June 6, 1888 Sept. 2, 1891
Berg, Walter Gilman. Chf. Engr., Lehigh Val. R. R. (Res., 261 West 52d St.), New York City		Feb. 5, 1896
Bergen, Van Brunt. Shore Road and 77th St., Brooklyn, N. Y		June 17, 1868
Beble, Kort. First Asst. Str. Engr., Superv. Archt.'s Office, Treasury Dept., Washington (Res., Brookland), D. C	Assoc. M. M.	Dec. 6, 1899 Nov. 4, 1903
Berrian, Richard Milford. 255 West 128th St., New York City		May 4, 1887
Betts, Fred Keeler. Asst. Engr., Dept. of Water Supply, Gas and Electricity, New York City, in Chg. of San. Patrol of the Croton, Bronx and Byram Watersheds, Katonah, N. Y		May 4, 1898
Beugler, Edwin James. Res. Engr., The Boston Terminal Co., 220 South Station, Boston, Mass	Jun. Assoc. M. M.	June 19, 1891 Feb. 1, 1899 Jan. 5, 1904
Biddle, John. Maj., Corps of Engrs., U. S. A., Washington, D. C.		July 4, 1894
Biddle, William Foster. 4305 Spruce St., Philadelphia, Pa		June 4, 1884
Bienenfeld, Bernard. Cons. Engr., 2158 Pine St., San Francisco, Cal.		May 6, 1903
Bigelow, Edward Manning. Pittsburg, Pa		Dec. 4, 1889
Billin, Charles Emery. Mfr., Special Machinery, 205 Goethe St., Chicago, Ill	Jun. M.	April 5, 1876 July 3, 1878
Binkley, George Holland. Engr. and Mgr., Ry. Dept., Kohler Bros., Contr. Elec. Engrs., 1804 Fisher Bldg., Chicago, Ill		Oct. 1, 1902
Bisbee, Fred Milton. Engr., H. E. Lantry, Gen. R. R. Contr., Fort Madison, Iowa		May. 3, 1899
Bishop, George H. 129 Main St., Middletown, Conn		Aug. 7, 1872
Bissell, Frank Edward. First Asst. Engr., L. S. & M. S. Ry., Cleveland, Ohio	Jun. M.	April 2, 1884 Sept. 2, 1891
Bissell, Hezekiah. Chf. Engr., B. & M. R. R., West Medford, Mass.		Sept. 15, 1869
Bixby, William Herbert. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Detroit, Mich		April 5, 1882

			Date of Membership.
R.	Black, William Murray. Maj., Corps of Engrs., U. S. A., Care, Isthmian Canal Comm., Corcoran Bldg., Washington, D. C.		June 6, 1888
	Blackford, Francis Webster. Chf. Engr., Cerro de Pasco Min. & Ry. Co., Cerro de Pasco, Peru		April 4, 1888
	Blackwell, Charles. Cons. Engr., Hyde Park, Station O, Cincinnati, Ohio		Sept. 7, 1881
	Blaisdell, Anthony Houghtaling. Civ. and Mech. Engr., Coeymans, Albany Co., N. Y.		Mar. 3, 1880
	Blakeley, George Henry. Chf. Engr., Passaic Steel Co., Paterson, N. J.	Jun. M.	Dec. 4, 1889 Oct. 2, 1895
	Blakeslee, Clarence. Civ. Engr. and Contr. (C. W. Blakeslee & Sons), 58 Waverly St. (Res., 598 George St.), New Haven, Conn.		June 4, 1895
	Bland, George Pierrepont. 510 Harrison Bldg., Philadelphia, Pa.	Jun. M.	April 7, 1875 May 4, 1881
	Bland, John Carlisle. Engr. of Bridges, Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa.	Jun. M.	May 12, 1875 June 4, 1879
	Bloss, Richard Parkhurst. Res. Engr., The Duncan Co., Mechanicsville, N. Y.		Jan. 6, 1904
	Blunt, William Titcomb. U. S. Asst. Engr., P. O. Box 142, Toledo, Ohio		Oct. 5, 1898
	Body, John Benjamin. Director, S. Pearson & Son, Ltd., Puente de Alvarado 15, City of Mexico, Mexico	Assoc. M. M.	Oct. 2, 1895 May 2, 1900
	Boehmer, Max. Min. Engr., 42 Jacobson Bldg., Denver, Colo.		Oct. 5, 1898
	Bogart, John. Cons. Engr., 40 Wall St., New York City		Feb. 17, 1869
	Boggs, Edward Marshall. Chf. Engr., Oakland Transit Consolidated, Oakland, Cal.		June 6, 1900
	Bogue, Virgil Gay. 15 William St., New York City (Res., 458 Washington Ave., Brooklyn, N. Y.)		Sept. 15, 1869
	Boller, Alfred Pancoast. Cons. Engr. (Boller & Hodge), 1 Nassau St., New York City		Dec. 4, 1867
	Bolton, Channing Moore. Cons. Engr., Rio, Albemarle Co., Va.		Jan. 4, 1888
	Bolton, Reginald Pelham. Cons. Engr., 35 Nassau St., New York City		Sept. 6, 1899
	Bond, Edward Austin. State Hall, Albany, N. Y.		Sept. 6, 1899
	Bond, George Meade. 141 Washington St., Hartford, Conn.		Feb. 2, 1887
	Bonnett, William Whitlock. Waterbury, Conn.		Sept. 4, 1872
	Bontecou, Daniel. 606 Postal Telegraph Bldg., Kansas City, Mo.		Nov. 5, 1879
	Bonzano, Adolphus. Pres., Bonzano Rail Joint Co., 331 South 18th St., Philadelphia, Pa.		Aug. 7, 1872
	Bonzano, Maximilian Ferdinand. Chf. Engr., The Pitts., Shawmut & Northern R. R. Co., Brookville & Mahoning R. R., etc., Olean, N. Y.		Jan. 6, 1886
	Booth, William Henry. 2 Queen Anne's Gate, Westminster, London, S. W., England		July 4, 1888
	Bosler, Harry Sherman. Jun. Engr., U. S. Engr. Dept., 209 Houston St., Chattanooga, Tenn.		Feb. 4, 1903
	Both, Carl Christian Adolph. U. S. Asst. Engr., U. S. Engr. Office, Portland, Me.		Sept. 2, 1891

			Date of Membership.
	Bott, John B. Engr., P. R. R., Greensburg, Pa.		Oct. 1, 1890
	BOUSCAREN, LOUIS FREDERIC GUSTAVE. (*Vice-President*). Cons. Engr., City Hall, Cincinnati, Ohio		April 7, 1875
	Bowers, George. City Engr., City Hall, Lowell, Mass.		Oct. 1, 1902
	Bowie, Augustus Jesse. Cons. Engr., 217 Sansome St., San Francisco, Cal.		Nov. 1, 1882
	Bowker, Willard Lewis. Supt. of Constr. for J. H. Wallace, New York City (Res., Walpole, Mass.)		June 3, 1903
	Bowman, Austin Lord. Civ. and Cons. Engr., 29 Broadway, Room 174, New York City	Assoc. M. M.	Sept. 7, 1892 Dec. 1, 1897
	Boynton, George Herbert. Pres., Gen. Constr. Co., Davenport, Iowa.		Sept. 3, 1884
	Brackenridge, John Crosbie. Commr. of Public Works, Borough of Brooklyn, City of New York, Borough Hall, Brooklyn, N. Y.		May 5, 1897
	Brackenridge, William Algernon. Cons. Engr., Niagara Falls Power Co. and Canadian Niagara Power Co., Niagara Falls, N. Y.		June 2, 1886
	Brackett, Dexter. Engr., Distrib. Dept., Met. Water-Works, 1 Ashburton Pl., Boston, Mass.		June 6, 1888
	Bradford, William. Mgr., Pittsburg Office, Westinghouse, Church, Kerr & Co., Westinghouse Bldg., Pittsburg, Pa.		Dec. 7, 1898
	Bradley, Daniel Edward. Berlin, Conn.		May 1, 1895
	Bradley, William Hammatt. 53 State St., Boston, Mass.		Feb. 5, 1879
	Bramwell, George Washington. Cons. Engr., 335 Broadway, New York City		Mar. 1, 1893
	Breckinridge, Cabell. Chf. Engr., Tennessee Ry.; Cons. Engr., Danville, Ky.		June 1, 1881
	Breckinridge, William Lewis. Chf. Engr., C., B. & Q. Ry., Chicago, Ill.		Oct. 7, 1903
	Breen, Howard. 275 S. Euclid St., Pasadena, Cal.		April 4, 1888
R.	Breithaupt, William Henry. Cons. Engr., Berlin, Ont., Canada	Jun. M.	June 4, 1884 July 6, 1887
	Bremner, George Hampton. Engr., Ill. Lines of C., B. & Q. Ry., 209 Adams St., Chicago, Ill.		Dec. 6, 1899
	Brendlinger, Peter Franklin. Civ. Engr. and Contr., 1009 Arcade Bldg., Philadelphia, Pa.		Sept. 7, 1887
	Breuchaud, Jules. Engr. and Contr., Croton Dam Contract, Croton-on-Hudson (Res., Park Hill, Yonkers), N. Y.	Assoc. M.	June 5, 1889 Oct. 5, 1898
	Briggs, Josiah Ackerman. Chf. Engr. in and for the Borough of the Bronx, New York City		Sept. 1, 1886
	Briggs, Roswell Emmons. Apartado 561, City of Mexico, Mexico.		Sept. 15, 1869
	Brinckerhoff, Alexander Gordon. Supt. of Works, Johnson & Morris, 30 West 13th St., New York City		Nov. 3, 1886
	Brinckerhoff, Henry Waller. Cons. Engr., 45 Broadway, New York City		Nov. 7, 1883
	Brinsmade, Daniel Seymour. Pres., The Ousatonic Water Co., Derby, Conn.		Feb. 1, 1888
	Brodhead, Calvin Easton. People's Bank Bldg., Wilkesbarre, Pa.		Feb. 21, 1872

		Date of Membership.
Brooks, Frederick. 31 Milk St., Boston, Mass	Jun. M.	June 7, 1876 Jan. 2, 1884
Brown, Alba Fisk. 271 Fortieth St., Pittsburg, Pa		Sept. 7, 1887
Brown, Baxter Lamont. Engr., Ill. Div., St. L., I. M. & S. Ry., Fourth St. and Chouteau Ave., St. Louis, Mo		April 1, 1903
Brown, Charles Carroll. Cons. Engr.; Editor, *Municipal Engineering Magazine,* 410 Commercial Club Bldg., Indianapolis, Ind		Oct. 2, 1895
Brown, Charles Otto. 200 Bushwick Ave., Brooklyn, N. Y	Jun. M.	Jan. 6, 1875 Nov. 7, 1877
Brown, Edward Du Bois. Archt., Lehigh Val. R. R., 159 West 45th St., New York City		June 3, 1903
Brown, Le Grand. Cons. Engr., 16 State St., Rochester, N. Y		May 4, 1898
Brown, Linus Weed. 741 Carondelet St., New Orleans, La		June 7, 1899
Brown, Ralph Henry. Chf. Engr., Eastern Bridge & Structural Co., Station A, Worcester, Mass		June 7, 1899
Brown, Thomas Ellis. Cons. Engr., Otis Elevator Co., 17 Battery Pl., New York City	Jun. M.	Nov. 3, 1880 April 2, 1884
Brown, Wendell Phillips. Engr., The King Bridge Co., Cleveland, Ohio	Assoc. M. M.	Oct. 2, 1895 Mar. 5, 1902
Brown, William Maxwell. Engr., Sewerage Works, Met. Water and Sewerage Board, 906 Pemberton Bldg., Boston, Mass		Feb. 5, 1896
Browne, George Hamilton. Hawkwood, Zion, Louisa Co., Va		Sept. 3, 1884
Browne, William Robert. 413 Fourth Ave., Room 502, Pittsburg, Pa.		June 1, 1898
Brownell, Ernest Henry. Civ. Engr., U. S. N., Navy Yard, Portsmouth, N. H	Assoc. M. M.	Jan. 1, 1896 Jan. 5, 1904
Brownlee, James Leeman. Cons. Engr., 29 Broadway, Room 174, New York City		May 6, 1896
Bruce, Fred William. U. S. Asst. Engr., Mayport, Fla		April 4, 1900
Brunner, John. Asst. Gen. Supt., North Works, Ill. Steel Co., Chicago (Res., 1732 Chicago Ave., Evanston), Ill		Mar. 2, 1898
Bryan, Charles Walter. Gen. Mgr., Contr. Dept., Eastern Div., Am. Bridge Co. of N. Y., 100 Broadway, New York City		June 3, 1903
Bryson, Andrew. Pres. and Treas., Brylgon Steel Casting Co., Reading, Pa		April 1, 1885
Buchanan, Edward Everett. Cons. Bridge Engr., Elmira, N. Y		Dec. 4, 1889
Buchholz, Carl Waldemar. Cons. Engr., Erie R. R., 21 Cortlandt St., New York City		Sept. 1, 1886
N. Buck, Leffert Lefferts. Cons. Engr., Dept. of Bridges, Park Row Bldg., New York City		Feb. 3, 1875
R. BUCK, RICHARD SUTTON. (*Director*). Cons. Engr., Dept. of Bridges, Park Row Bldg., New York City	Assoc. M. M.	April 5, 1893 Mar. 2, 1898
Buck, Waldo Emerson. Pres. and Treas., Worcester Mfrs. Mutual Insurance Co., 53 William St., Worcester, Mass		July 3, 1889
Budge, Edward Barnard. Engr. in Chf., 1st Section, Chili State Rys., Bella Vista Station, Valparaiso, Chili		Nov. 6, 1901
Budge, Enrique. Valparaiso, Chili		Feb. 1, 1882
Bullock, William Dexter. Asst. Engr. in Chg., Bridges and Harbor, City Engr.'s Office, Providence, R. I	Jun. M.	Sept. 5, 1887 July 4, 1888

			Date of Membership.
	Burbank, George Barker. White Plains, N. Y.		July 4, 1888
	Burden, James. Prin. Asst. Engr., Troy Water-Works Extension, 3 Locust Ave., Troy, N. Y.	Assoc. M. M.	Feb. 5, 1902 Jan. 5, 1904
	Burden, James A. Pres., Burden Iron Co., Woodside, Troy, N. Y.		July 2, 1879
	Burdett, Frederick Anderson. Cons. Engr., 3 East 33d St., New York City	Jun. Assoc. M. M.	Feb. 2, 1897 June 1, 1898 Oct. 7, 1903
	Burke, Milo Darwin. Room 18, N. E. cor. Fourth and Walnut Sts., Cincinnati, Ohio		July 4, 1894
	Burns, Edward Cook. 417 Spring St., Jamestown, N. Y		July 5, 1882
	Burns, Robert Bruce. Chf. Engr., A., T. & S. F. Ry. (Pacific Div.), S. C. Ry., G. C. Ry., Sunset Ry., 2642 Vermont Ave., Los Angeles, Cal.		Sept. 5, 1900
	Burpee, Moses. Chf. Engr., Bangor & Aroostook R. R., Houlton, Me		Sept. 3, 1884
	Burr, Edward. Maj., Corps of Engrs., U. S. A., Washington Barracks, Washington, D. C		May 6, 1891
R.	Burr, William Hubert. Prof. of Civ. Eng., Columbia Univ.; Cons. Engr., 151 West 74th St., New York City	Jun. Assoc. M.	June 3, 1874 May 5, 1880 Mar. 3, 1886
	Burrowes, Francis Smith. U. S. Asst. Engr., U. S. Engr.'s Office, Portland, Me.		June 6, 1888
	Burton, Alfred Edgar. Dean and Prof. of Topographical Eng., Mass. Inst. Tech., Boston, Mass		Sept. 4, 1901
	Burton, Standish Barry. Gen. Mgr., La Belle Creale Min. Co., Saltillo, Coahuila, Mexico		June 1, 1898
	Bush, Harry Dean. Mgr., Baltimore Bridge Co., Baltimore, Md.		May 2, 1888
	Butler, Matthew Joseph. Chf. Engr., Locomotive & Machine Co. of Montreal, Ltd., Montreal, Que., Canada		April 1, 1885
	Butterfield, Francis Eaves. Culiacan, Sinaloa, Mexico		Sept. 1, 1886
	Butts, Edward Pontany. Chf. Engr., Am. Writing Paper Co., Holyoke (Res., Springfield), Mass	Assoc. M. M.	Feb. 2, 1898 Oct. 7, 1903
	Buxton, Clifford. Chf. Engr., T. & O. C. and K. & M. Rys., Toledo, Ohio		May 6, 1885
C.	Byers, Morton Lewis. Asst. Gen. Supt., Transportation, B. & O. R. R., B. & O. Central Bldg., Baltimore, Md	Jun. M.	Jan. 2, 1890 Sept. 7, 1898
	Byllesby, Henry Manson. Pres., H. M. Byllesby & Co., Engrs., 422 New York Life Bldg., Chicago, Ill		June 1, 1887
	Cain, William. Univ. of North Carolina, Chapel Hill, N. C		Nov. 7, 1888
	Cairns, Robert Andrew. City Engr., Waterbury, Conn		Oct. 2, 1895
	Calkins, Frank Augustus. Edgewater, Jefferson Co., Colo		April 5, 1882
	Camp, Walter Mason. Editor, *Railway Review*, 7418 Parnell Ave., Chicago, Ill		May 1, 1901
	Campbell, Harry Huse. Gen. Mgr., The Pennsylvania Steel Co., Steelton, Pa		June 6, 1894

		Date of Membership.
Campbell, John Logan. Chf. Engr., Gasconade Ry. Constr. Co., Prin. Asst. Engr., St. L., K. C. & C. Ry., 911 Security Bldg., St. Louis, Mo		May 1, 1901
Canfield, Edward. Gen. Supt., N. Y., O. & W. Ry. Co., Middletown, N. Y		Dec. 3, 1879
Caples, Martin Joseph. Gen. Mgr., Pocahontas Coal & Coke Co., Roanoke, Va	Assoc. M. M.	Nov. 4, 1891 Oct. 4, 1899
Cappelen, Frederick William. Cons. Engr., 610 Globe Bldg., Minneapolis, Minn		April 3, 1895
Carll, David Sylvanus. Chf. Engr. and Supt., Capital Traction Co., Washington, D. C	Jun. Assoc. M. M.	Mar. 7, 1888 July 1, 1891 Oct. 7, 1896
Carothers, Daniel Dawson. Chf. Engr., B. & O. R. R. Co., Baltimore, Md		April 4, 1894
Carpenter, George Ansel. City Engr., Pawtucket, R. I		May 7, 1902
Carr, Albert. Engr., First Div., Rapid Transit Comm., 122 Liberty St., New York City (Res., 68 Carnegie Ave., East Orange, N. J.)	Assoc. M. M.	Mar. 2, 1892 Oct. 7, 1903
Carr, Walter Frank. Gen. Supt. and Chf. Engr., The Falk Co. (Res., 2819 Dunbar Pl.), Milwaukee, Wis		June 6, 1894
Carroll, Eugene. Chf. Engr. and Supt., Butte Water Co., Butte, Mont	Jun. Assoc. M. M.	Jan. 4, 1888 July 1, 1891 June 2, 1897
Carson, Howard Adams. Chf. Engr., Boston Transit Comm., 20 Beacon St., Boston, Mass		Feb. 7, 1894
Carson, William Waller. Prof. of Civ. Eng., Univ. of Tennessee, Knoxville, Tenn		Nov. 2, 1892
Carter, Edward Carlos. Chf. Engr., C. & N. W. Ry., Chicago, Ill		April 4, 1888
Carter, Henry Hall. Cons. Engr. and Pres., Met. Contr. Co., 95 Milk St., Boston, Mass		May 7, 1890
Carter, J. Rivers. Birmingham, Ala		Feb. 3, 1892
Cartwright, Robert. Cons. Engr., 6 Berkeley St., Rochester, N. Y		July 10, 1872
Cary, Edward Richard. (Cary & Roemer), 508 Cannon Pl., and Asst. Prof. of Geodesy, etc., Rensselaer Polytechnic Inst., Troy, N. Y.		April 2, 1902
Catt, George William. Pres. and Chf. Engr., Atlantic, Gulf & Pacific Co.; Cons. Engr., San Francisco Bridge Co.; Cons. Engr., Puget Sound Bridge & Dredging Co., Park Row Bldg., New York City		Sept. 7, 1892
Cattell, William Ashburner. Cons. Engr., Room 2138, Park Row Bldg., New York City	Assoc. M. M.	May 6, 1891 Oct. 7, 1896
Chamberlain, Phillip William. Cons. Engr., Dept. of Public Works of Nicaragua, Greytown, Nicaragua		Oct. 2, 1895
Chambers, Frank Taylor. Civ. Engr., U. S. N., Bureau of Yards and Docks, Navy Dept., Washington, D. C.	Assoc. M. M.	April 6, 1898 Mar. 3, 1903
R. CHANUTE, OCTAVE. (*Past-President*). Cons. Engr., 413 East Huron St., Chicago, Ill	M. F.	Feb. 19, 1868 July 11, 1872
Chapin, Loomis Eaton. Civ. and Cons. Engr., Central Savings Bank Bldg., Canton, Ohio	Jun. Assoc. M. M.	Dec. 3, 1884 Sept. 7, 1892 Nov. 4, 1896

			Date of Membership.
	Chapman, James Russell. Gen. Mgr. and Chf. Engr., Underground Elec. Rys. Co. of Lond., Ltd., Hamilton House, Victoria Embankment, London, E. C., England		Mar. 6, 1901
	Chase, Charles Francis. Civ. and Cons. Engr., 75 Westminster St., Providence, R. I.		Jan. 1, 1896
	Chase, Charles Francis. Chf. Engr., Berlin Constr. Co., Berlin (Res., 241 West Main St., New Britain), Conn.		Feb. 5, 1902
	Chase, Frank Lynton. Pres., Jamestown, Chautauqua & Lake Erie Ry.; Pres., Chautauqua Steamboat Co., Jamestown, N. Y.	Assoc. M. M.	Nov. 4, 1896 Nov. 1, 1899
	Chase, John Carroll. Chf. Engr. of Water Cos., Derry, N. H.		Mar. 1, 1893
	Chase, William Beverly. 667 Worcester Bldg., Portland, Ore.		Sept. 6, 1899
	Cheever, Albert Safford. Supt., Fitchburg Div., B. & M. R. R., Boston, Mass.		June 7, 1893
	Cheney, John Eugene. Asst. City Engr., City Hall, Boston, Mass.		May 7, 1884
	Chester, John Needels. Chf. Engr., Am. Water-Works & Guarantee Co., 1200 Bank for Savings Bldg., Pittsburg, Pa.	Jun. Assoc. M. M.	Dec. 6, 1892 Dec. 5, 1894 Mar. 6, 1901
	Chibas, Eduardo Justo. Cons. Engr. and Contr., Apartado 110, Santiago de Cuba, Cuba	Jun. Assoc. M. M.	Mar. 31, 1891 May 6, 1896 Jan. 3, 1900
	Child, Stephen. Landscape Archt. and Cons. Engr., 2A Park St., Boston, Mass.		Oct. 5, 1898
	Childs, James Edmund. Gen. Mgr., N. Y., O. & W. Ry., 56 Beaver St. (Res., 300 West 93d St.), New York City		Dec. 4, 1878
	Childs, Oliver W. Chf. Engr., Stupp Bros. Bridge & Iron Co., St. Louis, Mo.	Assoc. M. M.	Sept. 5, 1900 Sept. 3, 1902
	Chipman, Willis. 103 Bay St., Toronto, Ont., Canada		June 6, 1888
	Chittenden, Hiram Martin. Capt., Corps of Engrs., U. S. A., Sioux City, Iowa		Feb. 7, 1900
	Christie, George B. (Christie & Lowe, Civ. Engrs. and Contrs.), 171 La Salle St., Chicago, Ill.		Oct. 2, 1895
N.	Christie, James. Chf. Mech. Engr., Am. Bridge Co., Pencoyd, Pa.		May 7, 1873
	Church, Charles Titus. 155 William St., Geneva, N. Y.		May 1, 1889
	Church, George Earl. Dashwood House, 9 New Broad St., London, E. C., England		Nov. 2, 1887
	Churchill, Charles Samuel. Chf. Engr., Norfolk & West. Ry., Roanoke, Va.		May 1, 1889
	Churchill, John Charles, Jr. U. S. Asst. Engr., Oswego, N. Y.		Feb. 1, 1899
	Clapp, Otis Francis. City Engr., Providence, R. I.		Mar. 2, 1898
	Clark, Charles Henry. Engr., M. of W., Cleveland Elec. Ry. Co., Cleveland, Ohio		May 7, 1902
	Clark, George Huntington. Gen. Mgr., Birmingham Belt R. R. Co., Birmingham, Ala.		Mar. 5, 1890
	Clark, John Howard. 45 Lincoln St., Malden, Mass.		Nov. 4, 1903
	Clarke, David Dexter. Engr., Water Dept., City Hall, Portland, Ore.		July 5, 1882
N.	Clarke, Eliot Channing. 15 Brimmer St., Boston, Mass.		Sept. 4, 1878

		Date of Membership.
Clarke, George Calbraith. Res. Engr., Penn., N. Y. & L. I. R. R., 225 West 33d St. (Res., 440 Elm St., Richmond Hill), New York City		June 3, 1903
Clarkson, Robert Cooke. Cons. Engr., 710 Stephen Girard Bldg., Philadelphia, Pa.	Jun. M.	Jan. 5, 1887 Jan. 2, 1901
Claussen, Oscar. Cons. Engr., 514 German Am. Bank Bldg., St. Paul, Minn		Oct. 2, 1901
Clayton, Robert Morris. City Engr., Atlanta, Ga.		Mar. 4, 1896
Clement, Frank Hudson. Land Title Bldg., Philadelphia, Pa. (Res., 124 West 48th St., New York City)		Nov. 1, 1882
Codwise, Edward Bertie. City Engr., Kingston, Ulster Co., N. Y.		Sept. 5, 1888
Coe, William Watson. Gen. Mgr., Pocahontas Coal & Coke Co., Roanoke, Va		April 3, 1889
Coffin, Amory. 33 East 17th St., New York City		Mar. 3, 1875
Coffin, Freeman Clarke. Civ. and Hydr. Engr., 53 State St., Boston, Mass		Feb. 6, 1895
Coffin, Thomas Amory. Engr. and Contr., 45 Broadway, New York City	Jun. M.	Oct. 2, 1894 Feb. 1, 1899
Cogswell, William Brown. Vice-Pres. and Managing Director, Solvay Process Co., Syracuse, N. Y	Assoc. M.	Feb. 15, 1871 Oct. 16, 1872
Cohen, Frederick William. Engr. of Erection, Bridge and Constr. Dept., The Pennsylvania Steel Co., Steelton, Pa.	Assoc. M. M.	Feb. 3, 1897 Sept. 3, 1902
COHEN, MENDES. (*Past-President*). 825 North Charles St., Baltimore, Md		Dec. 4, 1867
Colby, Albert Ladd. Care, International Nickel Co., 43 Exchange Pl., New York City		Oct. 7, 1903
Colby, Branch Harris. Civ. and Cons. Engr., 415 Locust St., St. Louis, Mo		June 5, 1895
Cole, Howard Judson. 29 Broadway, New York City	Assoc. M. M.	Jan. 6, 1892 Mar. 1, 1899
Cole, John Adams. Civ. and Cons. Engr., 271 East 53d St., Chicago, Ill		Mar. 7, 1894
Cole, William Weeden. Vice-Pres. and Gen. Mgr., Elmira Water, Light & R. R. Co., Realty Bldg., Elmira, N. Y.		Oct. 7, 1903
Coleman, Clarence. U. S. Asst. Engr., Duluth, Minn		Nov. 3, 1897
Coleman, Frederick Albert. Supt., Bellington & Northern R. R. Co., Valley Coal & Coke Co., Bellington, W. Va	Jun. Assoc. M. M.	April 4, 1893 April 5, 1899 Dec. 1, 1903
Coleman, John Francis. Cons. Engr., 205 Hennen Bldg., New Orleans, La		Oct. 2, 1901
Collingwood, Francis. Cons. Engr., Elizabeth, N. J.; Office address, 220 West 57th St., New York City		Mar. 3, 1869
Collins, Daniel Charles Newman. 29 Broadway, New York City		April, 3, 1901
Comstock, Cyrus Ballou. Bvt. Brig.-Gen., U. S. A., 124 East 27th St., New York City		Sept. 1, 1880
Condron, Theodore Lincoln. Cons. Civ. Engr., 1750 Monadnock Bldg., Chicago, Ill	Assoc. M. M.	Feb. 1, 1899 Oct. 2, 1901

		Date of Membership
Connett, Albert Newmann. Chf. Engr., J. G. White & Co., Ltd., 22a College Hill, London, E. C., England	Jun. M.	June 6, 1883 Oct. 1, 1890
Connor, Edward Hanson. Engr., Mo. Val. Bridge & Iron Works, Leavenworth, Kans	Jun. Assoc. M. M.	Feb. 5, 1890 Feb. 3, 1892 April 4, 1900
Constable, Casimir. Constableville, N. Y.		June 17, 1868
Constable, Howard. Archt. and Engr., 22 East 16th St., New York City		Dec. 7, 1892
Cooke, Charles Henry. Chf. Engr., Great Falls Power Co., 55 Broadway (Res., 32 West 21st St.), NewYork City		Mar. 1, 1899
Cooley, Lyman Edgar. 21 Quincy St., Chicago, Ill		June 1, 1898
Cooley, Maurice Wurtz. Mgr., The New Trinidad Lake Asphalt Co., Ltd., and New York & Bermudez Co., Port of Spain, Trinidad	Assoc. M. M.	Mar. 7, 1894 Dec. 3, 1902
Coombs, Stephen Elbridge. Room 512, Grand Central Station, New York City		Sept. 3, 1902
Cooper, Samuel Lispenard. Commr. of Public Works, 9 Dock St., Yonkers, N. Y		Feb. 6, 1889
N. **Cooper, Theodore.** Cons. Engr., 35 Broadway, New York City		Mar. 4, 1874
Cornell, George Birdsall. Cons. Engr., 52 Broadway, New York City	Jun. M.	Aug. 6, 1879 Oct. 6, 1886
Corry, Thomas Avery. Res. Engr., Mex. Southern Ry., Puebla, Mexico		May 6, 1903
Corthell, Arthur Bateman. Terminal Engr., N. Y. C. & H. R. R. R., 110 East 50th St., New York City		Mar. 1, 1899
Corthell, Elmer Lawrence. 1 Nassau St., New York City		Sept. 2, 1874
Cotton, Joseph P. Newport, R. I		June 7, 1876
Courtenay, William Howard. Prin. Asst. Engr., L. & N. R. R., Louisville, Ky		July 3, 1889
Covode, James Henry. 1913 Pacific Ave., San Francisco, Cal		April 2, 1890
Cowles, Walter Linsley. Cons. Engr.; Secy., D. F. Holman Ry. Tracklayer Co., 140 Dearborn St., Chicago, Ill		Mar. 6, 1889
Cox, Abraham Beekman. Cherry Valley, N. Y		April 1, 1874
Craig, Chambers McKibbin. Myrtle Bank Hotel, Kingston, Jamaica		Nov. 3, 1886
CRAIGHILL, WILLIAM PRICE. (*Past-President*). Retired Chf. of Engrs. and Brig.-Gen., U. S. A., Charlestown, Jefferson Co., W. Va	M. Hon. M.	Oct. 7, 1885 Mar. 23, 1896
Crandall, Charles Lee. Prof. of Ry. Eng. and Geodesy; in Chg. of the Coll. of Civ. Eng., Cornell Univ., Ithaca, N. Y	Jun. M.	June 7, 1876 Oct. 5, 1892
Crane, Albert Sears. Prin. Asst. Engr., San. Dist. of Chicago, 1003 Security Bldg., Chicago, Ill	Jun. Assoc. M. M.	Sept. 3, 1895 May 4, 1898 May 1, 1901
Crane, Francis Elihu. City Engr., Amsterdam, N. Y		Oct. 1, 1902
CRAVEN, ALFRED. (*Director*). Engr., 2d Div., Rapid Transit Comm., 1947 Broadway, New York City (Res., 12 Highland Ave., Yonkers, N. Y.)		Dec. 5, 1888
Crawford, William. P. O. Box 487, Ottawa, Ont., Canada		Nov. 7, 1888

		Date of Membership.
Crehore, William Williams. 39 Cortlandt St., New York City	Assoc. M. M.	April 4, 1894 Sept. 3, 1902
Creuzbaur, Robert Walter. 280 Broadway, New York City	Jun. Assoc. M. M.	April 2, 1890 April 4, 1894 April 4, 1900
Crocker, Herbert Samuel. Asst. Erecting Mgr., Western Div., Am. Bridge Co. of N. Y., 1247 Monadnock Blk., Chicago, Ill		Oct. 2, 1901
N. CROES, JOHN JAMES ROBERTSON. (*Past-President*). Cons. Engr., 68 Broad St., New York City		Dec. 4, 1867
Crosby, Benjamin Lincoln. Auditor, Missouri Lines of C., B. & Q. Ry. Co., St. Joseph, Mo	Jun. M.	June 2, 1880 Oct. 6, 1886
Crosby, Horace. City Engr., New Rochelle, N. Y		Feb. 17, 1869
Crosby, Wilson. 418 Hammond St., Bangor, Me		Sept. 15, 1869
Crowell, Foster. Cons. Civ. Engr., 18 Broadway, New York City		Dec. 1, 1880
Crump, Ralph Lee. Merchantville, N. J		Dec. 3, 1902
Cumming, Adelbert Eugene. Engr. and Supt. of Irrig. Constr., Ft. Belknap, Harlem, Mont		June 6, 1894
Cummings, Robert Augustus. Civ. and Contr. Engr., 609 House Bldg., Pittsburg, Pa	Jun. Assoc. M. M.	Oct. 1, 1890 May 4, 1892 June 1, 1898
Cummings, William Warren. Supt. of Isolated Plant Dept., Edison Elec. Illuminating Co., 3 Head Pl., Boston, Mass		June 7, 1899
Cunningham, Andrew Chase. Civ. Engr., U. S. N., U. S. Naval Academy, Annapolis, Md	Assoc. M. M.	Sept. 2, 1891 Oct. 3, 1894
Cunningham, Andrew Oswald. Bridge Engr., Wabash R. R., 911 Lincoln Trust Bldg., St. Louis, Mo		Feb. 5, 1902
Cunningham, David West. 627 West 18th St., Los Angeles, Cal		May 7, 1873
Cunningham, James Henry. 2 Ravelston Pl., Edinburgh, Scotland		Aug. 6, 1879
CURTIS, FAYETTE SAMUEL. (*Vice-President*). Fourth Vice-Pres., N. Y., N. H. & H. R. R. Co., South Terminal Station, Boston, Mass		April 3, 1889
Curtis, Walter Whaley. Cons. Engr., 324 Dearborn St., Chicago, Ill		Sept. 5, 1888
Cushing, Edward Benjamin. Engr., M. of W., G. H. & S. A. and T. & N. O. Rys., 1518 Crawford St., Houston, Tex		Nov. 1, 1893
Cushing, William Channing. Chf. Engr., M. of W., S. W. System, Penn. Lines, Union Station, Pittsburg, Pa	Jun. Assoc. M. M.	June 5, 1889 Nov. 4, 1891 May 1, 1901
Cutshaw, Wilfred Emory. City Engr., Richmond, Va		Mar. 4, 1891
Dabney, Augustine Lee. Contr. Engr., 43½ Madison St., Memphis, Tenn		Oct. 2, 1901
Dakin, Albert Harlow, Jr. Asst. Engr., C. R. R. of N. J., 370 St. Nicholas Ave., New York City		April 1, 1903
Danforth, Frederic. 29 Pleasant St., Gardiner, Me		Sept. 2, 1891
Darling, Fred Steere. Div. Engr. of Constr., C. P. Ry., Windsor St. Station, Montreal, Que., Canada		Oct. 7, 1903

		Date of Membership.
Darling, John Henry. U. S. Prin. Asst. Engr., 532 West Third St., Duluth, Minn.		May 1, 1901
Darling, William Lafayette. Chf. Engr., C., R. I. & P. Ry. Co., C., O. & G. R. R. Co., St. L., K. C. & Colo. R. R. Co., Chicago, Ill.		Oct. 5, 1892
Darrach, Charles Gobrecht. Cons. Engr., Ridley Park, Pa.		Jan. 5, 1876
Dart, Carlton Rollin. Bridge Engr., San. Dist. of Chicago, 555 Monroe St., Chicago, Ill.		May 6, 1903
Dart, Justus Vinton. Chg. of Highway Dept., City Hall, Providence, R. I.		April 4, 1900
Datesman, George Elvin. Prin. Asst. Engr., Bureau of Surveys, 416 City Hall, Philadelphia, Pa.		Feb. 4, 1903
Dauchy, Walter Edward. Supt., Heating Dept., Erie City Iron Works, 7153 Princeton Ave., Chicago, Ill.		Nov. 4, 1903
Davies, John Vipond. Cons. Engr. (Jacobs & Davies), 128 Broadway, New York City.		June 6, 1894
Davis, Arthur Powell. Superv. Engr., U. S. Reclamation Service, Washington, D. C.	Assoc. M. M.	June 7, 1893 Oct. 4, 1899
Davis, Chandler. 499 Fifth Ave., New York City.	Jun. Assoc. M. M.	Dec. 3, 1890 Feb. 6, 1895 Oct. 4, 1899
Davis, Charles. County Engr., Allegheny Co., Court House, Pittsburg (Res., 912 Western Ave., Allegheny), Pa.		Sept. 15, 1869
Davis, Charles E. L. B. Lt.-Col., Corps of Engrs., U. S. A., Chf. Engr. Officer of the Div., Manila, Philippine Islands		July 12, 1877
Davis, Charles Henry. Cons. Engr., 25 Broad St., New York City.		Dec. 4, 1895
Davis, Chester Birge. Cons. Engr., City Hall, Dallas, Tex.		Feb. 1, 1882
Davis, John Rose Wilson. Engr., M. of W., G. N. Ry. Line, St. Paul, Minn		Nov. 4, 1903
Davis, Joseph Baker. Prof. of Geodesy and Surv., Univ. of Mich., 731 S. Ingalls St., Ann Arbor, Mich.	Jun. M.	April 1, 1874 Oct. 5, 1898
Davis, Joseph Phineas. Cons. Engr., 113 West 38th St., New York City.		Jan. 29, 1868
Davis, Robert Benjamin. Designing Engr., Bost. Elev. Ry. Co., 101 Milk St., Boston, Mass.		July 3, 1889
DAVISON, GEORGE STEWART. (*Director*). Cons. Engr., 514 Smithfield St., Pittsburg, Pa		April 2, 1890
Dawley, Edwin Peleg. Asst. Chf. Engr., N. Y., N. H. & H. R. R., South Station, Boston, Mass.		April 1, 1885
Dean, Luther. Taunton, Mass.		May 4, 1898
Deans, John Sterling. Chf. Engr., The Phœnix Bridge Co., Phœnixville, Pa.		May 4, 1887
Deen, James Work. Div. Engr., D. & R. G. R. R., Salida, Colo.		Jan. 6, 1892
Defrees, Morris M. 55 Ingalls Blk., Indianapolis, Ind.		Mar. 3, 1880
de Funiak, Frederick. Cons. Engr., 204 East Chestnut St., Louisville, Ky.		May 7, 1873
de la Barre, William. Engr., Agt. and Treas., St. Anthony Falls Water Power Co., Minneapolis, Minn.		April 5, 1893
Delano, Frederic Adrian. Gen. Mgr., C., B. &. Q. R. R., Chicago, Ill.		June 4, 1902

		Date of Membership.
DENNIS, ARTHUR CRISFIELD. Clarksburg, W. Va		Dec. 4, 1901
DENNIS, WILLIAM FRANKLIN. (V. P. Rinehart & Dennis Co., Contrs.), Monongahela House, Pittsburg, Pa		Feb. 1, 1888
DERBY, GEORGE McCLELLAN. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, St. Paul, Minn		April 1, 1896
DERRICK, HENRY CLAY. Houston, Halifax Co., Va		Oct. 5, 1887
DE VARONA, IGNACIO MARÉA. Chf. Engr., Dept. of Water Supply, Gas and Electricity, Brooklyn, N. Y		April 7, 1886
DEVIN, GEORGE. 1 Newark St., Hoboken, N. J		Sept. 7, 1887
DE WITT, PHILIP HOFFECKER. Cons. Engr., G. B, Markle & Co., Jeddo, Pa		May 5, 1897
DEYO, SOLOMON LEFEVRE. (*Vice-President*). Chf. Engr., Interborough Rap. Trans. Co., 2108 Fifth Ave., New York City		June 6, 1888
DIDIER, PAUL. Asst. Chf. Engr., B. & O. R. R. Co., Allegheny City, Pa		Mar. 6, 1889
DIEBITSCH, EMIL. With John Peirce, 277 Broadway, New York City	Jun. Assoc. M. M.	Feb. 28, 1893 Oct. 6, 1897 Mar. 5, 1902
DILLMAN, GEORGE LINCOLN. Chf. Engr., Western Pacific Ry., San Francisco, Cal		Mar. 4, 1891
D'INVILLIERS, CAMILLE STANISLAUS. Engr. of Constr., P. R. R. Co., Cresson, Pa		Jan. 4, 1888
DIXON, CHARLES YOUNG. U. S. Asst. Engr., Amherstburg, Ont., Canada		Nov. 4, 1903
DOANE, WALTER A. City Civ. Engr., Meadville, Pa		Sept. 7, 1881
DONOVAN, CORNELIUS. U. S. Asst. Engr., Room N, Custom House, New Orleans, La		Oct. 4, 1899
DONOVAN, JOHN JOSEPH. Gen. Supt. and Chf. Engr., B. B. & B. C. R. R. Co. and B. B. I. Co., Bellingham, Wash	Jun. M.	April 7, 1886 April 4, 1888
DOREMUS, ABRAHAM FAIRBANKS. State Engr., Salt Lake City, Utah		Oct. 4, 1893
DORR, EDGAR SUTTON. Chf. Engr., Sewer Div., Street Dept., 30 Tremont St., Boston, Mass.		April 3, 1895
DOSE, HENRY FREDERICK. Res. Engr., Penn., N. Y. & L. I. R. R. Co., East River Div., 225 West 33d St., New York City		Jan. 6, 1904
DOUGLAS, BENJAMIN. Bridge Engr., Mich. Cent. R. R., Detroit, Mich	Jun. M.	June 1, 1887 Jan. 2, 1890
DOUGLAS, EDWARD MOREHOUSE. Care, U. S. Geological Survey, Washington, D. C		Dec. 4, 1901
DRAKE, ALBERT BAILEY. 164 William St., New Bedford, Mass		Oct. 4, 1893
DRAKE, WILLIAM ABIAL. Gen. Supt. and Chf. Engr., S. F., P. & P. Ry. Co., Prescott, Ariz		Dec. 5, 1883
DU BOIS, AUGUSTUS JAY. Prof. of Civ. Eng., Sheffield Scientific School, New Haven, Conn	Jun. M.	July 7, 1875 Oct. 5, 1892
DUDLEY, CHARLES BENJAMIN. Chemist, P. R. R. Co., Drawer 156, Altoona, Pa		Mar. 2, 1892
DUGGAN, GEORGE HERRICK. Asst. to Pres., Dominion Iron & Steel Co., Dominion Coal Co., Sydney, N. S., Canada		Oct. 2, 1895
DUN, JAMES. Chf. Engr., A., T. & S. F. Ry. System, Chicago, Ill		June 7, 1876

		Date of Membership.
Dunckleе, John Butler. Civ. and Cons. Engr., 170 Broadway, New York City		April 2, 1873
Dunham, Herbert Franklin. 220 Broadway, New York City		Oct. 1, 1890
Dunham, Lewis Augustus. 404 New England Bldg., Kansas City, Mo.		June 3, 1903
Dunlap, De Clermont. Albuquerque, N. Mex		Jan. 4, 1888
Dunn, Daniel Burke. Div. Engr., Constr., Atlanta & Birmingham Air Line Ry., Austell, Ga		Dec. 2, 1891
Duryea, Edwin, Jr. Chf. Engr., Bay Cities Water Co., Mutual Savings Bank Bldg., San Francisco, Cal.	Jun. Assoc. M. M.	Feb. 2, 1887 Sept. 4, 1895 Feb. 2, 1898
Dyer, Arthur James. Engr., Great Falls Power Co., 63 Arcade Bldg., Nashville, Tenn	Assoc. M. M.	Mar. 6, 1901 Feb. 4, 1903
Earl, George Goodell. Gen. Supt. and Chf. Engr., Sewerage and Water Board, 602 Carondelet St., New Orleans, La.	Jun. Assoc. M. M.	May 7, 1890 Dec. 2, 1891 April 4, 1894
Earley, John Edwin. Civ., Hydr. and San. Engr., Calle Ortega No. 28, City of Mexico, Mexico		April 5, 1876
Easby, Marmaduke Ward. Cons. and Const. Engr., 1420 Chestnut St., Philadelphia, Pa	Assoc. M. M.	Nov. 4, 1891 Dec. 1, 1897
Eaton, Frederick. Cons. Engr., Am. National Bank Bldg., Los Angeles, Cal		May 5, 1886
Eckart, William Roberts. Cons. Engr., Room 4, Nevada Blk., San Francisco, Cal		Jan. 5, 1881
Eckert, Edward William. 452 West 153d St., New York City		Feb. 3, 1886
Edes, William Cushing. Asst. Engr., S. P. Co., 4 Montgomery St., San Francisco, Cal	Jun. M.	Sept. 1, 1886 Nov. 4, 1896
Edwards, Harry Winter. Chf. Engr., Chihuahua & Pacific R. R., Apartado 46, Chihuahua, Mexico		June 4, 1890
Edwards, James Harvey. Asst. Chf. Engr., Am. Bridge Co.; Res., Oxford, Chenango Co., N. Y	Jun. Assoc. M. M.	May 31, 1892 May 2, 1894 May 4, 1898
Edwards, Nathaniel Marsh. Hydr. Engr., 814 College Ave., Appleton, Wis		June 3, 1874
Eidlitz, Otto Marc. Builder, 489 Fifth Ave., New York City		Sept. 2, 1902
Eldridge, Archibald Ronaldson. Chf. Draftsman, C., B. & Q. Ry., Bridge Dept., 209 Adams St., Chicago, Ill		Oct. 2, 1901
Eldridge, Griffith Morgan. Mgr., Eldridge Drug Stores, Americus, Ga	Assoc. M. M.	June 1, 1892 Sept. 3, 1902
Elliott, Charles Gleason. Expert in Chg. of Drainage Investigations, Dept. of Agriculture, Washington, D. C.		Sept. 3, 1890
Ellis, George Ezra. Signal Engr. and Western Agt., Pneumatic Signal Co., 1033 Monadnock Blk., Chicago, Ill	Jun. Assoc. M. M.	Mar. 2, 1897 Mar. 7, 1900 Dec. 4, 1901
ELLIS, JOHN WALDO. (*Director*). Cons. Engr., Woonsocket, R. I. (also 20 Market Sq., Providence, R. I.)		July 3, 1895
Ellis, Samuel Clarence. 1750 Beacon St., Brookline, Mass		Aug. 7, 1872

		Date of Membership.
ELMER, HOWARD NIXON. Mgr., Chicago Office, The Trenton Iron Co., 1114 Monadnock Blk., Chicago, Ill		April 7, 1886
ELWELL, CHARLES CLEMENT. Supt., Shore Line Div., N. Y., N. H. & H. R. R. Co., New London, Conn		July 1, 1891
ELY, THEODORE NEWEL. Chf. of Motive Power, P. R. R., Broad St. Station, Philadelphia, Pa		Mar. 2, 1881
EMERY, JAMES ALBERT. Gen Mgr., Birmingham Ry., Light & Power Co., Birmingham, Ala		June 4, 1902
EMIGH, JOHN H. Cons. Engr., North Adams, Mass		April 3, 1901
EMMONS, CHARLES MORTON. Asst. Engr. with Penn Bridge Co., Beaver Falls, Pa		April 1, 1903
ENDICOTT, MORDECAI THOMAS. Rear-Admiral and Civ. Engr., U. S. N.; Chf. of Bureau of Yards and Docks, U. S. Navy Dept., Washington, D. C		April 4, 1877
ENGLE, ROBERT L. 1530 Westminster Ave., Cincinnati, Ohio		Sept. 7, 1881
ENO, FRANK HARVEY. Assoc. Prof. of Civ. Eng., Ohio State Univ., Columbus, Ohio		Mar. 4, 1903
ERICSON, JOHN ERNST. City Engr. of Chicago; Res., 1914 Arlington Pl., Chicago, Ill		May 7, 1902
ERLANDSEN, OSCAR. Dept. of Bridges, 32 Sutton Pl., New York City	Jun.	May 1, 1889
	Assoc. M.	Dec. 2, 1891
	M.	Oct. 7, 1896
ERNST, OSWALD HERBERT. Col., Corps of Engrs., U. S. A.; Mem., Isthmian Canal Comm.; Pres., Mississippi River Comm.; Mem., International Lake Levels Comm.; Div. Engr., Northwest Div., 1637 Indiana Ave., Chicago, Ill		July 4, 1888
EVANS, GEORGE EDWIN. Civ. and Hydr. Engr., 95 Milk St., Boston, Mass.		May 2, 1888
EVANS, LOUIS HYDE. Contr. Engr., 7 East 42d St., New York City		July 3, 1889
EVANS, RICHARD. Room 1, Town Hall, Jamaica, Queens Co., N. Y		June 7, 1893
EWEN, JOHN MEIGGS. 143 Dearborn St., Chicago, Ill		June 3, 1903
EWING, WILLIAM BION. City Engr., La Grange, Ill	Jun.	April 3, 1889
	Assoc. M.	Feb. 3, 1892
	M.	Nov. 2, 1898
FAIRLEIGH, JAMES ANDREW. With Western Cement Co., Louisville, Ky		Sept. 2, 1891
FANNING, JOHN THOMAS. Cons. Engr., 330 Hennepin Ave., Minneapolis, Minn		Aug. 7, 1872
FARLEY, GODFREY PEARSON. Gen. Mgr. and Civ. Engr., W., W. & F. R. R. Co., Wiscasset, Me. (also 100 Broadway, New York City)		June 6, 1900
FARLEY, JOHN MOYER. Cons. Engr., White Plains, N. Y.	Jun.	Dec. 5, 1888
	Assoc. M.	July 1, 1891
	M.	Sept. 1, 1897
FARNUM, HENRY HARRISON. 324 East 150th St., New York City		July 1, 1891
FARRAR, HARTWELL PRENTICE. Civ. Engr., M. & O. R. R., Jackson, Tenn		Nov. 1, 1893
FARRINGTON, HARVEY. Cons. Engr., 115 Broadway, New York City	Jun.	June 19, 1891
	Assoc. M.	Feb. 6, 1895
	M.	Oct. 1, 1902

		Date of Membership.
Fay, Frederic Harold. Asst. Engr., Eng. Dept., 60 City Hall, Boston, Mass.	Jun. Assoc. M. M.	Oct. 2, 1894 April 2, 1902 Jan. 5, 1904
Fehr, Harrison Robert. Miles-Fehr Contr. Co., Drake Bldg., Easton, Pa.		Oct. 5, 1898
Felt, Charles Frederick Wilson. Chf. Engr., Gulf, Colo. & S. F. Ry., Galveston, Tex.		Mar. 3, 1897
Felton, Burton Rogers. Treas., C. E. Trumbull Co., Engrs. and Contrs., Tremont Bldg., Boston, Mass.	Assoc. M. M.	April 4, 1894 Oct. 7, 1896
Felton, Herbert Clark. Supt., Del. River Ferry Co. of N. J. of P. & R. Ry. System, Camden, N. J.		June 1, 1887
Felton, Samuel Morse. Pres., Chic. & Alton Ry., Kans. City, St. L. & Chic. R. R., Joliet & Chic. R. R., Grand Central Station, Chicago, Ill.		Jan. 4, 1882
Fendall, Benjamin Truman. City Engr., 128 W. La Fayette Ave., Baltimore, Md		May 7, 1902
Ferguson, George Robert. Asst. Engr., Dept. of Bridges, 1215 Park Row Bldg., New York City.		Dec. 3, 1902
Ferguson, Hardy Smith. Chf. Engr., Great Northern Paper Co., Millinocket, Me	Assoc. M. M.	Mar. 3, 1897 May 1, 1901
Ferguson, John William. Builder and Gen. Contr., 152 Market St., Paterson, N. J., and 253 Broadway, New York City	Jun. M.	Jan. 5, 1881 Feb. 2, 1887
Fernstrom, Henning. Chf. Engr., N. Y. C. & H. R. R. R., Room 519, Grand Central Station, New York City		May 7, 1902
Ferry, Charles Addison. With A. B. Hill, Cons. Civ. Engr., 24 Edgewood Ave., New Haven, Conn	Jun. M.	May 4, 1881 Jan. 2, 1889
Fiebeger, Gustave Joseph. Prof. of Eng., West Point, N. Y.		Oct. 2, 1895
Field, George Spencer. 452 Delaware Ave., Buffalo, N. Y.		April 7, 1880
Field, William Pierson. 976 Broad St., Newark, N. J.	Jun. M.	Dec. 7, 1887 Mar. 6, 1901
Fields, Samuel James. 937 Maryville Ave., St. Louis, Mo.		Mar. 5, 1884
Filley, Hiel Hamilton. 2816 Campbell St., Kansas City, Mo.		Jan. 3, 1883
Fink, Rudolph. Rural Free Delivery Route No. 20, St. Matthews, Jefferson Co., Ky.		Sept. 21, 1870
Finley, William Henry. Prin. Asst. Engr., C. & N. W. Ry. Co., Winnetka, Ill.		Feb. 4, 1903
Firmstone, Frank. Easton, Pa.		Aug. 7, 1878
Fisher, Edwin Augustus. City Engr., 294 Troup St., Rochester, N. Y.		July 4, 1888
Fisher, Elstner. Gen. Supt. and Chf. Engr., Toronto, Hamilton & Buffalo Ry. Co., Hamilton, Ont., Canada	Jun. Assoc. M. M.	April 3, 1889 June 2, 1897 Mar. 5, 1902
Fisher, Francis Davis. Care, Degnon Contr. Co., 13 Park Row, New York City		May 2, 1888
Fisher, Janon. Ruxton, Md.	Assoc. M. M.	May 4, 1892 Jan. 5, 1898
Fisher, Samuel Brownlee. Chf. Engr., Mo., Kans. & Tex. Ry. Co., 406 Wainwright Bldg., St. Louis, Mo.		Oct. 7, 1903

		Date of Membership.
Fisk, Walter Leslie. Maj., Corps of Engrs., U. S. A., 33 Campau Bldg., Detroit, Mich.		April 1, 1896
Fitch, Asa Betts. Lessee, The Graphic Mines & Smelting Works, Magdalena, N. Mex.		Mar. 5, 1884
Fitch, Charles Hall. Engr., Reclamation Service, U. S. Geological Survey, 3108 Q St., N. W., Washington, D. C.		June 5, 1901
Fitch, Charles Lincoln. Cons. Engr., 510 Manning Chambers, Toronto, Ont., Canada		Oct. 2, 1901
Fitch, Graham Denby. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Little Rock, Ark.		Feb. 4, 1903
N. **FITZGERALD, DESMOND.** (*Past-President*). Cons. Engr., Hydr. and San. Work, Brookline, Mass.		Sept. 3, 1884
FitzGerald, John Leland. Cons. Engr., 175 Jay St., Schenectady, N. Y.		Jan. 2, 1889
Flad, Edward. Cons. Engr., 1009 Fullerton Bldg., St. Louis, Mo.	Jun. M.	Jan. 7, 1885 Feb. 1, 1888
Flagg, Josiah Foster. Care, Brown, Shipley & Co., 123 Pall Mall, London, S. W., England		Oct. 7, 1874
Fleming, *Sir* **Sandford.** Cons. Engr., Ottawa, Ont., Canada		Sept. 18, 1872
Follett, William W. U. S. Cons. Engr., International Boundary Comm., United States and Mexico, El Paso, Tex.		July 5, 1893
Folwell, Amory Prescott. Cons. Municipal Engr., Easton, Pa.	Jun. Assoc. M. M.	Feb. 5, 1890 June 7, 1893 Nov. 3, 1897
Foote, Arthur DeWint. Supt., North Star Mines Co., Grass Valley, Cal.		May 7, 1884
Force, Cyrus Gildersleeve. Cons. Civ. Engr., Flanders, Morris Co., N. J.		Feb. 6, 1878
Forsyth, Robert. Cons. Engr., 1159 The Rookery, Chicago, Ill.		May 12, 1875
Foss, Fred Eugene. Prof. of Civ. Eng., The Pennsylvania State Coll., State College, Pa.		April 1, 1903
Foster, Ernest Howard. 126 Liberty St., New York City		May 6, 1903
Foster, Wilbur Fisk. Engr. and Contr., 3 Berry Blk., Nashville, Tenn.		May 7, 1873
Fouquet, John Douglas. Architectural Dept., N. Y. C. & H. R. R. R., Room 600, Grand Central Station, New York City (Res., Fishkill, N. Y.).		June 3, 1885
Fowler, Charles Evan. Pres. and Chf. Engr., Puget Sound Bridge & Dredging Co., 95 Yesler Way, Seattle, Wash.	Jun. Assoc. M. M.	May 7, 1890 Dec. 6, 1893 May 3, 1898
Fox, Stephenson Waters. Cons. Engr. (Fox & Smith), Kansas City Life Bldg., Kansas City, Mo.	Jun. M.	July 7, 1880 Oct. 6, 8861
Francis, Charles. Civ. Engr., State Board of Health, 8 Masonic Temple, Davenport, Iowa		May 4, 1892
Francis, George Blinn. Civ. Engr., Westinghouse, Church, Kerr & Co., 8 Bridge St., New York City	Jun. M.	Sept. 5, 1883 Nov. 7, 1888
Francis, Henry Newton. Arlington, R. I.	Jun. M.	Mar. 1, 1876 Nov. 7, 1888

			Date of Membership.
	Frank, George William. Engr. in Chg., Yadkin River Hydr. Development, New London, N. C.		Feb. 1, 1899
	Frazier, Harry. Cons. Engr., Seaboard Air Line Ry., 827 W. Grace St., Richmond, Va.		May 1, 1889
	FRAZIER, JAMES LEWIS. (*Director*). Gen. Supt., Tol., St. L. & West. R. R., Frankfort, Ind.		Sept. 1, 1880
N.	Freeman, John Ripley. Consulting Engineer; also Pres. and Treas., Mfrs'. Rhode Island and Mechanics' Insurance Cos., 812 Banigan Bldg., Providence, R. I.	Jun. M.	June 7, 1882 April 3, 1889
	French, Alexis Henry. Town Engr., Town Hall, Brookline; also of firm of French & Bryant, 334 Washington St., Brookline, and 4 State St., Boston, Mass.		June 6, 1894
	French, Alfred Willard. Pres., The French Oil Mill Machinery Co., Piqua, Ohio		May 2, 1900
	French, James Benton. Bridge Engr., Atlantic Ave. Impvt., Long Island R. R., 44 Court St., Brooklyn, N. Y.	Jun. Assoc. M. M.	Feb. 6, 1889 Feb. 7, 1894 Nov. 2, 1898
	French, Owen Bert. Asst., Coast and Geodetic Survey, Washington, D. C.		April 1, 1903
	Frew, Archibald Smith. Chf. Engr., Chillagoe Ry. & Mines Co., Ltd., Mareeba, Queensland, Australia		Oct. 3, 1900
	Freyhold, Felix. 236 First St., S. E., Washington, D. C.	Assoc. M. M.	Sept. 2, 1891 April 2, 1902
	Frink, Ellis Alexander. (Frink & Hazen, Cons. and Contr. Engrs.), 711 Union Trust Bldg. (Res., Hotel Condon), Baltimore, Md.	Assoc. M. M.	June 6, 1900 Dec. 4, 1901
	Fritch, Louis Charlton. Supt., B. & O. S. W. Ry., Miss. Div., Washington, Ind.		Oct. 3, 1900
	Fritz, John. Bethlehem, Pa.	M. Hon. M.	July 5, 1893 Sept. 5, 1899
	Frizell, Joseph Palmer. Civ. and Hydr. Engr., 75 Linden St., Dorchester Dist., Boston, Mass.		Jan. 3, 1883
	Frye, Albert Irvin. 426 Jefferson Ave., Elizabeth, N. J.		Dec. 2, 1896
	Fuertes, James Hillhouse. Hydr. and San. Engr., 140 Nassau St., New York City	Jun. M.	May 2, 1888 Feb. 6, 1895
	Fuller, Frank Louis. 12 Pearl St., Room 36, Boston, Mass.	Jun. M.	April 4, 1883 April 4, 1888
	Fuller, Franklin Ide. Gen. Mgr., Portland Ry. Co., 222 Washington St., Portland, Ore.		Jan. 6, 1886
	Fuller, William Barnard. Hydr. and San. Engr., 170 Broadway, New York City	Jun. M.	June 3, 1885 May 1, 1895
	Fulton, John Addison. 184 La Salle St., Room 1115, Chicago, Ill.		May 4, 1887
	Furber, William Copeland. Archt. and Cons. Engr., 421 Chestnut St., Room 504, Philadelphia, Pa.		May 2, 1899
	Gadsden, George Morrall. Director of Public Works, Savannah, Ga.		May 4, 1898
	Gahagan, Walter Hamer. Contr. Engr., 189 Montague St., Brooklyn, N. Y.	Jun. Assoc. M. M.	Sept. 5, 1888 July 1, 1891 April 3, 1901

		Date of Membership.
Gamble, Francis Clarke. Public Works Engr., Insp. of Dykes and Insp. of Rys., British Columbia, Victoria, B. C., Canada		April 1, 1891
Gardiner, Edmund LeBreton. Ridgewood, N. J		June 7, 1882
Gardner, George Clinton. Pres., Flemington Coal & Coke Co., 35 Wall St. (Res., Beech St. N., Richmond Hill, Queens Borough), New York City		Nov. 3, 1875
Gardner, Martin Luther. Asst. Engr., P. R. R., Jersey City (Res., 58 Elizabeth Ave., Newark), N. J.	Assoc. M. M.	Sept. 2, 1891 Mar. 4, 1896
Garrison, Everett. City Engr., City Hall, Newburgh, N. Y		Mar. 7, 1894
Gatchell, George Samuel. Mgr., Buffalo Elevating Co., 68 Board of Trade, Buffalo, N. Y		May 7, 1884
Gates, Christopher Lawrence. Cons. Engr., 416 Irving St., Toledo, Ohio	Jun. M.	Dec. 4, 1878 Sept. 5, 1883
Gates, Horace Delphos. Asst. to City Engr., 311 Lyon St., San Francisco, Cal		Mar. 7, 1883
Gay, Charles Webster. 25 Exchange St., Lynn, Mass		May 6, 1891
Gay, Martin. Asst. Engr., Dept. of Bridges, 21 Park Row, New York City	Jun. M.	June 4, 1884 June 5, 1889
Gayler, Carl. Bridge Engr., Street Dept., City Hall, St. Louis, Mo.		Sept. 3, 1884
Gayol, Roberto. Director General de Obras Publicas del Distrito Federal, P. O. Box 766, City of Mexico, Mexico		Mar. 2, 1892
Geddes, Edmund Burns. U. S. Asst. Engr., Natchez, Miss		Mar. 2, 1898
Geddes, James Kennon. Gen. Mgr., Ohio River & Western Ry. Co., Zanesville, Ohio		Jan. 2, 1890
Geer, Harvey Mosher. Ballston, N. Y		June 6, 1894
Gemmell, Robert Campbell. Supt., Minas Bonanza y Anexas, Hacienda de Bonanza, Zac., via Saltillo, Coah., Mexico	Assoc. M. M.	Oct. 5, 1892 Dec. 4, 1895
Gerber, Emil. Asst. to Pres., Am. Bridge Co., Frick Bldg., Pittsburg, Pa		Feb. 1, 1888
Gerig, William. U. S. Asst. Engr., Lock Box 217, Memphis, Tenn.		Mar. 5, 1902
Gerry, Martin Hughes, Jr. Chf. Engr. and Gen. Mgr., Missouri River Power Co., Helena, Mont	Assoc. M. M.	June 6, 1900 Dec. 3, 1902
Gibbs, Charles Wingate. Civ. and Min. Engr., Telluride, Colo		Jan. 2, 1889
Gibbs, George. Cons. Engr., Interborough Rap. Trans. Co., P. R. R. Co., N. Y. C. & H. R. R. R. Co., First Vice-Pres., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City		Mar. 6, 1895
Gifford, George Edwin. Eastern Representative, The King Bridge Co., 120 Liberty St., New York City	Assoc. M. M.	Oct. 7, 1891 Jan. 1, 1896
Giles, Robert. (Giles & Harris), San Juan, Porto Rico		May 6, 1891
Gillette, Edward. Supt., Sheridan Div., B. & M. R. R. R., Sheridan, Wyo		July 3, 1889
Gillette, Lewis Singer. Pres., Elec. Steel Elevator Co., Minnesota Malleable Iron Co., Gulf Slate Co., Minneapolis, Minn.		June 7, 1899
Gladding, Henry Holbrook. Asst. City Engr., 30 Stanley St., New Haven, Conn	Jun. M.	July 1, 1885 Jan. 4, 1888
Glasgow, Arthur Graham. (Humphreys & Glasgow), 38 Victoria St., Westminster, London, England		Jan. 3, 1900

		Date of Membership.
Goad, Charles Edward. 15 Wellington St., West, Toronto, Ont., Canada (also 185 St. James St., Montreal, Que., Canada, and 53 New Broad St., London, E. C., England)		Sept. 7, 1881
Going, Alvah Seymour. Hillside Ave. and Cook St., Victoria, B. C., Canada	Assoc. M. M.	May 4, 1892 June 7, 1899
R. **Goldmark, Henry.** Engr. in Chg., New Shops, Canadian Pacific Ry., Montreal, Que., Canada	Jun. M.	May 7, 1884 June 6, 1888
Goodale, Loomis Farrington. Chf. Engr., The Missouri Lines, C., B. & Q. Ry. System, 610 Globe Democrat Bldg., St. Louis, Mo.		Nov. 7, 1900
Goodnough, Xanthus Henry. Chf. Engr., State Board of Health, Room 140, State House, Boston, Mass	Assoc. M. M.	May 6, 1896 June 4, 1902
Goodrich, Wilbur Francis. 10 Gibbens St., Somerville, Mass.		May 4, 1887
Gotshall, William Charles. 76 William St., New York City		May 7, 1902
Gould, Edward Sherman. Cons. Engr., Yonkers, N. Y		Nov. 4, 1885
Gould, William Tillotson. Chf. Engr.'s Office, Brooklyn Heights R. R. Co., Franklin Trust Bldg., Brooklyn, N. Y		Jan. 2, 1890
GOWEN, CHARLES SEWALL. (*Director*). Engr., New Croton Dam, Ossining, N. Y		Mar. 7, 1888
Grafton, Charles Edwin. New Cumberland, W. Va		Jan. 1, 1896
Graham, Charles Hallett. Engr. in Chg. of Sewers, Borough of the Bronx, 177th St. and Third Ave., New York City		Sept. 7, 1887
Graham, Joseph Marshall. Chf. Engr., B. & O. R. R., Baltimore, Md		April 4, 1900
Grant, Emerson Warren. Asst. Engr., A., T. & S. F. Ry., Rural Route No. 2, Topeka, Kans.		Dec. 4, 1889
Grant, Justus Herbert. 82 German Insurance Bldg., Rochester, N. Y.		Mar. 2, 1892
Grantham, Herbert Thomas. Chf. Engr., Belmont Iron Works, 1622 Real Estate Trust Bldg., Philadelphia, Pa.	Assoc. M. M.	Feb. 5, 1896 May 7, 1902
Graves, Edwin Dwight. Chf. Engr., Conn. River Bridge and Highway Dist. Comm., 650 Main St., Hartford, Conn.	Assoc. M. M.	Jan. 2, 1895 Dec. 2, 1896
Gray, George Edward. 1155 Bush St., San Francisco, Cal	M. Hon. M.	July 2, 1873 June 5, 1894
Gray, John Henry. 2019 Fuller Bldg., New York City		Oct. 2, 1895
Gray, Samuel Merrill. Cons. Engr., Room 930, Banigan Bldg., Providence, R. I		May 15, 1872
Green, Bernard Lincoln. Secy., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio.		April 3, 1901
Green, Bernard Richardson. Supt., Building and Grounds, Library of Congress, Washington, D. C		Oct. 2, 1889
Green, Hubert Edward. Engr., U. S. Geological Survey, Div. of Hydrography, 431 Rialto Bldg., San Francisco, Cal.		Dec. 2, 1903
Greene, Benjamin Dwight. Stamford, Conn		Nov. 4, 1885
Greene, David Maxson. Cons. Engr., 41 First St., Troy, N. Y.		May 20, 1868
Greene, Francis Vinton. Pres., The Niagara Constr. Co., Ltd., Buffalo, N. Y.		June 3, 1885
Greene, George Sears, Jr. Cons. Engr., 11 Broadway, New York City		Dec. 4, 1867

			Date of Membership.
	Greene, Joseph Norton. The Quincy, Boston, Mass		Oct. 5, 1887
N.	**Greiner, John Edwin.** Engr., Bridges and Bldgs., B. & O. R. R., Calvert Bldg., Baltimore, Md		June 4, 1890
	Gresham, Robert Hall. 501 Ave. C, San Antonio, Tex		May 4, 1898
	Griffin, Eugene. V.-P., Gen. Elec. Co., 44 Broad St., New York City		June 7, 1899
	Griggs, Julian. Chf. Engr., Dept. of Public Service, Columbus, Ohio		Oct. 4, 1899
	Grimm, Carl Robert. 1622 Caton Ave., Flatbush, Brooklyn, N. Y		June 4, 1890
	Grimshaw, James Walter. Australian Club, Sydney, New South Wales, Australia		Nov. 7, 1888
	Grunsky, Carl Ewald. City Engr., San Francisco, Cal		Oct. 5, 1898
	Guild, Josephus Conn. Chattanooga, Tenn		June 1, 1898
	Gunnell, William Covington. 600 Twentieth St., N. W., Washington, D. C		Feb. 7, 1877
	Guppy, Benjamin Wilder. Bridge Engr., Maine Cent. R. R., Portland, Me	Jun. Assoc. M. M.	June 19, 1891 Oct. 3, 1894 Feb. 6, 1901
	Guthrie, Edward Buckingham. Chf. Engr., Grade Crossing Comm. (Res., 158 North Pearl St.), Buffalo, N. Y	Assoc. M.	Sept. 3, 1884 Oct. 5, 1887
	Hague, Charles Arthur. Cons. Engr., 114 Liberty St., New York City		Feb. 3, 1892
	Haight, Stephen Samuel. Civ. Engr. and City Surv., 1986 West Farms Rd. (Res., 1989 Clinton Ave.), New York City		June 1, 1881
	Haines, Caspar Wistar. Chf. Engr., Richmond, Fredericksburg & Potomac R. R. and Washington South. Ry., Richmond, Va	Jun. M.	Feb. 2, 1876 Oct. 7, 1891
	Haines, Henry Stevens. 374 Fifth Ave., New York City		Nov. 2, 1887
	Hains, Peter Conover. Brig.-Gen., U. S. A., Isthmian Canal Comm., Washington, D. C		April 2, 1890
	Hale, Richard Augustus. Prin. Asst. Engr., Essex Co., Lawrence, Mass	Jun. M.	Feb. 6, 1884 July 1, 1891
	Hall, Benjamin Mortimer. 409 Temple Court (Res., 190 Forrest Ave.), Atlanta, Ga		Feb. 6, 1901
	Hall, Henry Arthur. Asst. Engr., Met. Park Comm., 14 Beacon St., Boston, Mass		May 7, 1902
	Hall, Julien Astin. Cons. Engr., Wenonda, Va		June 5, 1889
N.	**Hall, William Hammond.** Cons. Engr., 324 Haight St., San Francisco, Cal		Jan. 2, 1884
	Hall, William McLaurine. Citizens Guaranty Bldg., Parkersburg, W. Va		Dec. 6, 1893
	Hambleton, Francis Henry. Cons. Engr., 5 W. Baltimore St., Baltimore, Md		Mar. 5, 1873
	Hamilton, William Gaston. 105 East 21st St., New York City		Oct. 7, 1868
	Hamlin, George Herbert. Orono, Me		July 3, 1895
	Hammatt, Edward Augustus White. Civ. and Hydr. Engr., Hyde Park, Mass		June 5, 1901
	Handy, Edward Adino. Chf. Engr., L. S. & M. S. Ry., L. E. & W. R. R., Ind., Ill. & Ia. R. R. and L. E. A. & W. R. R., Cleveland, Ohio		Jan. 2, 1889

		Date of Membership.
Hanna, John Venable. Asst. Chf. Engr., Frisco System; Care, Frisco System, St. Louis, Mo	Assoc. M. M.	May 3, 1893 April 2, 1902
Hansel, Charles. V.-P. and G. M., Pneumatic Signal Co., Rochester, N. Y		Oct. 3, 1894
Harahan, William Johnson. Asst. Gen. Mgr., I. C. R. R., Chicago., Ill	Assoc. M. M.	Oct. 3, 1894 Oct. 7, 1903
Hardaway, Benjamin Hurt. Gen. Contr., Columbus, Ga		Oct. 7, 1903
Hardee, William Joseph. City Engr., Room 19, City Hall, New Orleans, La		May 6, 1896
Harding, George Edward. Civ. Engr. and Archt., 253 Broadway, New York City		Mar. 3, 1875
Harding, Henry. Civ. and Hydr. Engr., Hartland (Fourcorners), Vt		May 7, 1873
Haring, James Smith. Crafton, Allegheny Co., Pa		Nov. 4, 1891
Harley, Alfred Francis. Mandarin, Fla		Dec. 7, 1898
Harlow, George Richardson. 620 Wood St., Wilkinsburg, Pittsburg, Pa		Nov. 1, 1899
Harlow, James Hayward. Chf. Engr., Susquehanna Elec. Power Co., 1402 Continental Bldg., Baltimore, Md		Mar. 4, 1874
Harrington, Ephraim. Civ. and Cons. Engr., 60 State St., Boston, Mass		Mar. 3, 1897
Harrington, John Lyle. C. W. Hunt Co., West New Brighton, N. Y	Jun. Assoc. M. M.	Aug. 31, 1897 Oct. 4, 1899 Dec. 1, 1903
Harris, Elmo Golightly. Prof. of Civ. Eng., School of Mines, Univ. of Missouri, Rolla, Mo		Oct. 2, 1901
Harris, Stephen. Asst. Engr., P. & R. Ry., Room 602, Reading Terminal, Philadelphia, Pa		June 4, 1902
Harrison, Charles Lewis. Prin. Asst. Engr., East River Div., P., N. Y. & L. I. R. R. Co., 225 West 33d St., New York City		Mar. 2, 1898
Harrison, Edlow Wingate. Cons. Engr.; Chf. Engr., Jersey City Water Supply Co., 15 Exchange Pl., Jersey City, N. J		June 3, 1885
HARROD, BENJAMIN MORGAN. (*Past-President*). Cotton Exchange Bldg., New Orleans, La		April 4, 1877
Harroun, Philip Embury. Hydr. and Irrig. Engr., Berkeley, Cal		Mar. 7, 1900
Hartrick, Edward Macaulay. U. S. Asst. Engr. in Chg. River and Harbor Impvts., Galveston, Tex		Feb. 1, 1899
R. Harts, William Wright. Capt., Corps of Engrs., U. S. A.; Secy. California Debris Comm., Flood Bldg., San Francisco, Cal	Assoc. M. M.	Oct. 2, 1895 April 6, 1898
Hasbrouck, Charles Alfred. Asst. to Vice-Pres., Am. Bridge Co., 1315 Monadnock Blk., Chicago, Ill	Assoc. M. M.	Feb. 3, 1892 Dec. 5, 1894
Hasie, Montague Sylvester. Pres., Texas Bridge Co., Dallas, Tex		Feb. 3, 1897
Haskell, Eugene Elwin. Prin. Asst. Engr., U. S. Lake Survey, Campau Bldg., Detroit, Mich		Sept. 7, 1898
Haskins, William Jewett. Cons. Engr. and Contr., 32 Broadway, New York City	Jun. M.	Mar. 7, 1883 Dec. 1, 1886

		Date of Membership.
Haswell, Charles Haynes. Civ. and Mech. Engr.; Asst. Engr., Board of Estimate and Apportionment, 324 West 78th St., New York City		Jan. 29, 1868
Hatch, Frederick Thomas. Supt., Vandalia Line, Terre Haute, Ind.		Dec. 4, 1889
Hatton, Thomas Chalkley. Cons. Engr., Wilmington, Del.		Mar. 6, 1895
Haupt, Lewis Muhlenberg. Cons. Engr., 107 North 35th St., Philadelphia, Pa.		June 6, 1888
Haven, William Appleton. Inspecting Engr., Erie R. R., Room 10, Erie R. R. Depot, Buffalo, N. Y.		Mar. 5, 1873
Haviland, Arthur. Law Dept., N. Y. C. & H. R. R. R. Co., Grand Central Station, New York City	Jun.	Jan. 4, 1882
	M.	Jan. 4, 1888
Hawks, James Dudley. Pres., Detroit & Mackinac Ry. Co., Detroit, Ypsilanti, Ann Arbor & Jackson Ry., Grand Rapids, Grand Haven & Muskegon Ry. Co., Detroit, Mich.		Dec. 3, 1884
Hawksley, Kenneth Phipson. 30 Great George St., Westminster, S. W., London, England		May 6, 1903
Hawley, John Blackstock. City Engr., Fort Worth, Tex.	Assoc. M.	May 1, 1895
	M.	Oct. 5, 1898
Hawley, William Chauncey. Chf. Engr. and Gen. Supt., Pennsylvania Water Co., 701 Wood St., Wilkinsburg, Pa.	Jun.	Oct. 1, 1890
	Assoc. M.	April 6, 1892
	M.	Dec. 3, 1902
Hayden, William Wallace. Chf. Engr., M. J. & K. C. R. R., Mobile, Ala.		Nov. 6, 1895
Hayes, Edmund. Ellicott Sq., Buffalo, N. Y.	Jun.	April 3, 1878
	M.	Mar. 5, 1884
Hayes, Edward. Chf. Engr., Public Impvt. Comm., Cohoes, N. Y.		June 5, 1901
Hayes, George Samuel. 111 Fifth Ave., New York City.	Jun.	Dec. 6, 1892
	Assoc. M.	June 3, 1896
	M.	Sept. 2, 1903
Hayes, Henry Wilde. Div. Engr., B. & M. R. R., Boston, Mass	Assoc. M.	Mar. 2, 1898
	M.	May 1, 1901
Hayes, Richard Somers. 32 Nassau St., New York City		Sept. 6, 1882
Hayes, Stanley Wolcott. Engr. in Chg., R. A. & S. Ry. (for Westinghouse, Church, Kerr & Co.), Geneva, N. Y.		June 6, 1900
Hays, John Willis. 3 South Adams St., Petersburg, Va.		June 5, 1901
Hayt, Stephen Thurston, Jr. Gen. Supt. and Chf. Engr., Susq. & N. Y. R. R., Towanda, Pa.		Mar. 3, 1897
Hazard, Schuyler. Cons. Engr., 24 South Broadway, White Plains, N. Y.		Oct. 5, 1898
Hazelton, Charles William. Engr. and Treas., Turners Falls Co., Turners Falls, Mass.		Jan. 7, 1891
R. Hazen, Allen. Cons. Engr., St. Paul Bldg., New York City	Assoc. M.	June 3, 1896
	M.	Mar. 6, 1900
Hazlehurst, George Blagden. Cons. Engr., 376 East Colorado St., Pasadena, Cal.		Feb. 1, 1888
Hazlehurst, James Nisbet. Chf. Engr., Board of Public Works, Mobile, Ala.		Oct. 4, 1899
Heald, Simpson Clark. Rockwood St., Jamaica Plain, Mass.		Nov. 4, 1885

		Date of Membership.
Healy, John Francis. Gen. Supt., Davis Coal & Coke Co., Thomas, W. Va.	Jun. Assoc. M. M.	Jan. 2, 1890 June 3, 1891 Nov. 1, 1899
Hedrick, Ira Grant. (Waddell & Hedrick, Cons. Engrs.), 608 New Nelson Bldg., Kansas City, Mo.	Jun. Assoc. M. M.	Oct. 3, 1893 June 2, 1897 Nov. 7, 1900
Henderer, William Oswald. Vice-Pres., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio		April 3, 1901
Henderson, John Baillie. Govt. Hydr. Engr., Brisbane, Queensland, Australia		June 4, 1890
Hendrick, Calvin Wheeler. Engr., Sewers, R. T. Comm., 10 Bridge St. (Res., 220 West 59th St.), New York City		Nov. 7, 1900
Henny, David Christiaan. Mgr., Redwood Mfrs. Co., 204 Front St., San Francisco, Cal		Sept. 7, 1887
Henry, Daniel Farrand. 52 Woodward Ave., Detroit, Mich		July 7, 1875
Hequembourg, Charles Ezra. 305 Central Ave., Dunkirk, N. Y.		June 5, 1901
Herbert, Arthur Powis. Engr. and Supt., Colima Div., Mex. National Constr. Co., Colima, Col., Mexico		Sept. 5, 1888
Herbert, Harry Monmouth. Cons. and Contr. Engr., Bound Brook, N. J.		April 6, 1898
Hering, Rudolph. Hydr. and San. Engr., 170 Broadway, New York City		Jan. 5, 1876
Hermann, Edward Adolph. Cons. Engr., 812 Security Bldg., St. Louis, Mo		April 6, 1887
HERMANY, CHARLES. (*President*). Chf. Engr. and Supt., Water Co., 549 Third St., Louisville, Ky		Jan. 6, 1869
Herrick, Henry Augustus. Hydr. and Mill Engr., 242 Prospect St., Manchester, N. H.		May 7, 1890
Herron, John. Mgr., The Tomboy Gold Mines Co., Ltd., Telluride, Colo.		Oct. 4, 1893
R. Herschel, Clemens. Hydr. Engr., 2 Wall St., New York City		April 21, 1869
Heuer, William Henry. Lt.-Col., Corps of Engrs., U. S. A., 41 Flood Bldg., San Francisco, Cal		Mar. 3, 1880
Hewes, Virgil Henry. Care of Lewinson & Just, 128 West 42d St., New York City		Feb. 3, 1904
Hewitt, Charles Edward. Gen. Mgr., The Trenton Iron Co., Trenton, N. J		Oct. 5, 1887
Hickok, Henry Addison. Mech. Engr., 762 Broad St., Newark, N. J.		Oct. 7, 1896
Hider, Arthur. U. S. Asst. Engr.; Res. Engr. in Local Chg. of Impvts., Lake Providence Reach, Mississippi River, Greenville, Miss		Sept. 7, 1881
Hildenbrand, Wilhelm. Cons. and Contr. Engr.; Cons. Engr. for John A. Roebling's Sons Co.; Am. Representative of the "Abt" system of rack railways, 1 Broadway, New York City		Feb. 5, 1902
Hilgard, Karl Emil. Cons. Civ. Engr.; Prof. of Civ. Eng., Federal Swiss Polytechnic Inst., 18 Steinwiesstrasse, Zurich, V., Switzerland		June 4, 1890
Hill, Albert Banks. Cons. Civ. Engr., 100 Crown St., New Haven, Conn	Jun. M.	Feb. 2, 1876 Mar. 5, 1884

		Date of Membership.
Hill, George. Archt. and Cons. Engr., 100 Broadway, New York City	Assoc. M. M.	Oct. 4, 1893 Feb. 1, 1899
Hill, John Willmuth. Chf. Engr., Bureau of Filtration, Room 710, City Hall, Philadelphia, Pa	Jun. M.	Feb. 3, 1875 April 5, 1876
Hill, Walter Hovey. Chf. Engr., Lewiston & S. E. Elec. Ry. Co., Lewiston, Idaho		June 5, 1901
R. **Hill, William Ryan.** 242 Sixth Ave., Brooklyn, N. Y		July 1, 1891
Hillyer, William Ross. Asst. Commr. of Public Works, Borough of Richmond, City of New York, Richmond Bldg., New Brighton (Res., 13 Charles Ave., Port Richmond), N. Y		May 6, 1903
Hilton, George Porter. Vice-Pres., Hilton Bridge Constr. Co., Albany, N. Y		May 1, 1889
Himes, Albert James. Bridge Engr., N. Y. C. & St. L. R. R., 521 Hickox Bldg., Cleveland, Ohio	Assoc. M. M.	Nov. 6, 1895 June 7, 1899
Himmelwright, Abraham Lincoln Artman. Mgr., The Roebling Constr. Co., Fuller Bldg., 23d St. and Broadway, New York City		Oct. 5, 1898
Hinckley, Howard Vernon. Cons. Engr., Sulphur, Ind. T		Dec. 5, 1883
Hinckley, John Franklin. Chf. Engr. of Constr., Frisco System, 800 Fullerton Bldg., St. Louis, Mo		May 6, 1885
Hindes, Stetson George. Pacific Coast Mgr., Atlantic, Gulf & Pacific Co., 220 Market St., San Francisco, Cal		June 3, 1903
Hinds, Franklin Allen. Cons. Engr., 28 Flower Bldg., Watertown, N. Y		May 3, 1899
Hitchcock, Frederick Collamore. Care, Geo. S. Good & Co., 27 Railroad Bldg., Denver, Colo	Assoc. M. M.	Mar. 7, 1894 Feb. 6, 1895
Hoag, Sidney Willett, Jr. Asst. Engr., Dept. of Docks and Ferries, Pier A, N. R., 208 West 121st St., New York City		Sept. 2, 1885
Hobson, Joseph. Chf. Engr.'s Office, Grand Trunk Ry. Co., Montreal, Que., Canada		Feb. 5, 1890
Hodgdon, Frank Wellington. Chf. Engr., Mass. Board, Harbor and Land Commrs., Room 131, State House, Boston, Mass		Dec. 3, 1884
Hodge, Harry Seymour. Vice-Pres., Detroit Twist Drill Co., 83 Alfred St., Detroit, Mich		Oct. 3, 1894
Hodge, Henry Wilson. Cons. Engr. (Boller & Hodge), 1 Nassau St., New York City	Jun. M.	Jan. 5, 1887 Oct. 2, 1895
Hodges, Gilbert. Cons. Engr., 131 State St., Rooms 826-828, Boston, Mass		June 4, 1890
Hodges, Harry Foote. Maj., Corps of Engrs., U. S. A., Room 116, State, War and Navy Bldg., Washington, D. C		Mar. 4, 1903
Hoff, Olaf. Engr. of Structures, N. Y. C. & H. R. R. R., 504 Grand Central Station, New York City		May 6, 1885
Hoffman, Nathaniel Baker Klink. Asst. Engr., Dept. of Sewers (Res., 1 Nelson Ave.), Bronx, New York City		Nov. 6, 1901
Holbrook, Elliot. 713 Garfield Ave., Kansas City, Mo		Sept. 3, 1902
Holbrook, Frederick William Doane. The Navy Yard, Puget Sound, Bremerton, Kitsap Co., Wash		Oct. 6, 1886

		Date of Membership.
HOLBROOK, HENRY RANDOLPH. Pres., The Laguna Canal Co., Pueblo, Colo		Jan. 2, 1890
HOLGATE, HENRY. Cons. Engr. (Ross & Holgate), 78 St. Francois Xavier St., Montreal, Que., Canada		Oct. 2, 1901
HOLLYDAY, RICHARD CARMICHAEL. Civ. Engr., U. S. N., Navy Yard, Brooklyn, N. Y		Sept. 2, 1903
HOLMAN, MINARD LAFEVER. Cons. Engr., 3744 Finney Ave., St. Louis, Mo		April 2, 1884
HOLMES, HOWARD CARLETON. Cons. Engr.; Chf. Engr., San Francisco Dry Dock Co., San Fran., Oakland & San Jose Ry. Co., Room 12, Ferry Bldg., San Francisco, Cal		Nov. 4, 1903
HOLT, HERBERT SAMUEL. 297 Stanley St., Montreal, Que., Canada		Mar. 6, 1889
HOOD, RICHARD HADEN. Care, R. H. Hood Co., 220 Broadway, New York City	Assoc. M. M.	May 3, 1893 Nov. 2, 1898
HOOD, WILLIAM. Chf. Engr., S. P. Co., 4 Montgomery St., San Francisco, Cal		Oct. 7, 1896
HOOK, CHARLES ADDISON. 400 East Madison St., Baltimore, Md		Jan. 3, 1900
HOOK, GULIAN SCHMALZ. Civ. Engr., Gen. Elec. Co., Schenectady, N. Y		Apr. 3, 1901
HOOVER, JOSEPH WARREN. Bridge Engr., Gen. Agt., The Canton Bridge Co. of Canton, Ohio, 514 New York Life Bldg., Kansas City, Mo		June 6, 1888
HOPKINS, CHARLES COMSTOCK. (Knight & Hopkins), Rome, N. Y		June 4, 1890
HORN, FRANK CHURCHILL. Res. Engr., Denver Union Water Co., Cheesman, Colo		Sept. 1, 1903
HORTON, HORACE E. Prop., Chicago Bridge & Iron Works, Chicago, Ill		Sept. 6, 1882
HOTCHKISS, CHARLES WILCOX. Cons. Engr., 401 La Salle St. Station, Chicago, Ill		Jan. 5, 1898
HOUGH, DAVID LEAVITT. Pres., The United Eng. & Contr. Co., 13 Park Row, New York City		May 5, 1897
HOUGH, ULYSSES B. Civ. and Mech. Engr., 1503 Ninth Ave., Spokane, Wash		Nov. 5, 1902
HOUSE, FRANCIS EDWIN. Pres., D. & I. R. R. R. Co., Duluth, Minn		May 1, 1895
HOVEY, OTIS ELLIS. Engr. of Design, Am. Bridge Co., 100 Broadway, New York City	Assoc. M. M.	April 4, 1894 Jan. 3, 1900
HOWARD, FREDERICK BILLINGS. Grosse Ile, Wayne Co., Mich	Jun. M.	Mar. 3, 1875 Nov. 6, 1878
HOWARD, JOHN LEWIS. Div. Engr., Charles River Basin Comm., 367 Boylston St., Boston, Mass	Assoc. M. M.	Dec. 7, 1898 April 2, 1902
HOWE, EDWARD WILLARD. Asst. Engr., Eng. Dept., 65 City Hall, Boston, Mass		Sept. 7, 1887
HOWE, HORACE JOSEPH. Asst. Engr., Rapid Transit R. R. Commrs., 231 West 125th St., New York City	Jun. M.	May 2, 1888 Mar. 2, 1898
HOWE, MALVERD ABIJAH. Prof., Civ. Eng., Rose Polytechnic Inst. (Res., 2108 North 10th St.), Terre Haute, Ind	Assoc. M.	May 7, 1890 Jan. 1, 1896
HOWE, WILLIAM BELL WHITE. Cons. Engr., Spartanburg, S. C		Mar. 1, 1893
HOWELL, DAVID JANNEY. 605 Twelfth St., N. W., Washington, D. C		Sept. 5, 1900

		Date of Membership.
Howell, Franklin Davinport, Jr. 1339 Kellam Ave., Los Angeles, Cal.		June 5, 1901
Howells, Julius Merriam. 8-36 Mills Bldg., San Francisco (Res., Belvedere, Marin Co.), Cal		June 4, 1902
Hoxie, Richard Leveridge. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, 812 St. Paul St., Baltimore, Md		June 2, 1886
Hoyt, William Edwin. Cons. Engr., and Asst. Engr., N. Y. C. & H. R. R. R. Co. (Res., 50 Westminster Rd.), Rochester, N. Y.		Mar. 5, 1884
N. **Hubbell, Clarence William.** Civ. Engr. to Board of Water Commrs., 232 Jefferson Ave., Detroit, Mich.	Jun. Assoc. M. M.	May 31, 1898 April 4, 1900 Jan. 5, 1904
Hudson, Clarence Walter. Asst. Engr., Phœnix Bridge Co., Phœnixville, Pa.	Assoc. M. M.	Nov. 7, 1894 Feb. 7, 1900
Hudson, John Rogers. 1806 Locust St., St. Louis, Mo		May 4, 1887
Hughes, William Mackenzie. Cons. Bridge Engr., 401 La Salle St. Station, Chicago, Ill		June 2, 1880
Humphreys, Alexander Crombie. Pres., Buffalo Gas Co.; Pres., Stevens Inst. of Technology; Care, Humphreys & Glasgow, 31 Nassau St., New York City		Mar. 6, 1895
Humphreys, David Carlisle. Dean, Coll. of Eng. and Prof., Civ. Eng., Washington and Lee Univ., Lexington, Va.		Nov. 2, 1887
HUNT, CHARLES WARREN. (*Secretary*). 220 West 57th St. (Res., 171 West 88th St.), New York City		Jan. 2, 1884
Hunt, Conway Bethune. Engr. of Highways, District of Columbia, District Bldg. (Res., 1815 M St., N. W.), Washington, D. C.		Feb. 4, 1891
Hunt, Robert Woolston. Cons. Engr., Care, Robert W. Hunt & Co., 1121 The Rookery, Chicago, Ill		June 3, 1885
Hunter, William. Room 520, Reading Terminal, Philadelphia, Pa.		June 5, 1895
Hurry, Edward Henry. 1 Broadway, Room 122, New York City		June 1, 1898
Hutchings, William Evelyn. Asst. Engr., L. & N. R. R. (Res., 1578 Barrett Ave.), Louisville, Ky		June 7, 1899
Hutchins, Jere Chamberlain. Pres., Detroit United Ry., 12 Woodward Ave., Detroit, Mich	Assoc. M. M.	Mar. 2, 1898 April 4, 1900
Hutchinson, George Hunt. Chf. Engr., North Western Fuel Co., St. Paul, Minn	Assoc. M. M.	Sept. 2, 1891 June 7, 1893
Hutton, Nathaniel Henry. Engr. and Pres., Harbor Board, City Hall, Baltimore, Md		June 3, 1896
Hyde, Abraham Lincoln. Asst. Prof. of Civ. Eng., Univ. of Missouri, Columbia, Mo	Assoc. M. M.	April 5, 1893 Oct. 6, 1897
Ingalls, Owen Lovejoy. City Engr., Manila, Philippine Islands	Jun. M.	Mar. 5, 1890 June 4, 1902
Ingersoll, Colin Macrae, Jr. Chf. Engr., N. Y., N. H. & H. R. R., New Haven, Conn		June 5, 1895
Irwin, James Clark. Address unknown	Jun. Assoc. M. M.	April 4, 1893 Dec. 7, 1898 June 6, 1900
Isaacs, John Dove. Engr. of Bridges, S. P. Co.; Asst. Engr., M. of W., Pacific System and Lines in Oregon, S. P. Co., 4 Montgomery St., San Francisco, Cal		Mar. 7, 1894

		Date of Membership.
Ives, Arthur Stanley. Civ. and Elec. Engr., R. D. Wood & Co., 400 Chestnut St., Philadelphia, Pa.	Jun. Assoc. M. M.	Jan. 7, 1896 Jan. 3, 1900 May 7, 1902
Jackman, Howard Hill. 2177 Washington Boulevard, Chicago, Ill.		May 6, 1891
Jackson, Dugald Caleb. Prof. of Elec. Eng., Univ. of Wisconsin; Cons. Engr., Madison, Wis.		Nov. 2, 1898
Jackson, Jones Mumford. Cons. Engr., 32 Washington Ave., Schenectady, N. Y.		Sept. 1, 1886
Jackson, Thomas Moore. Pres., West Va. Short Line R. R., Clarksburg, W. Va.		June 3, 1891
JACKSON, WILLIAM. (*Director*). City Engr., 50 City Hall, Boston, Mass.		Sept. 3, 1884
Jackson, William Benjamin. Cons. Engr., Madison, Wis.		Mar. 4, 1903
Jacomb-Hood, John Wykeham. Chf. Engr., Lond. & S. W. Ry., Engr.'s Office, Waterloo Station, London, S. E., England		Feb. 5, 1902
Jameson, Charles Davis. Gen. Mgr., Jameson & Co., Tientsin, China.		Mar. 7, 1888
Jamieson, John Quintin. 475 Hassalo St., Portland, Ore.		Nov. 6, 1889
Janney, William Dean. Chf. Engr., Northern Ry., Limon, Costa Rica.		April 1, 1896
Jaques, William Henry. 483 Beacon St., Boston, Mass.		July 2, 1890
Jardine, Alexander William. Brisbane, Queensland, Australia.		April 2, 1890
Jarvis, Charles Maples. First Vice-Pres., Am. Hardware Corporation, New Britain, Conn.		Jan. 7, 1885
Jaycox, Thomas William. Deputy State Engr., State House, Denver, Colo.		Jan. 4, 1882
Jenkins, William Dunbar. Res. Engr.-in-Chg., Mo. Pac., Arkansas and White River Bridges, Arkansas City, Ark.		Sept. 7, 1887
Jennings, William Tyndale. Cons. Engr., 48 Knight St., West, Toronto, Ont., Canada		April 2, 1884
Jewett, William Cornell. Res. Engr., Commrs. of Water-Works (Res., 541 Ridgeway Ave.), Cincinnati, Ohio		June 3, 1885
Johnson, Albert Lincoln. Chf. Engr., St. Louis Expanded Metal Fire-proofing Co., 606 Century Bldg., St. Louis, Mo.	Assoc. M. M.	Sept. 2, 1896 Dec. 4, 1901
Johnson, Chapman Love. Cons. Engr., 238 Mary St., Utica, N. Y.		Oct. 7, 1903
Johnson, Francis Robert. 21 Langside, Winnipeg, Man., Canada.		June 1, 1898
Johnson, James Moreland. Engr. and Pres., Louisville Bridge & Iron Co., Louisville, Ky.		July 1, 1891
Johnson, Lewis Elisha. Engr. of Constr., Bridge Dept., Pennsylvania Steel Co., Steelton, Pa.	Assoc. M. M.	Nov. 4, 1896 May 1, 1901
Johnson, Lorenzo Medici. Winnetka, Cook Co., Ill	Jun. M.	Mar. 3, 1875 April 7, 1880
Johnson, Lucien Samuel. Asst. Gen. Supt. and Engr., Whitehouse Cannel Coal Co., Torchlight Coal Co., Louisa, Lawrence Co., Ky.		Dec. 4, 1901
Johnson, Phelps. Mgr., Dominion Bridge Co., Ltd., Windsor Hotel, Montreal, Que., Canada		July 1, 1891
Johnson, Thomas H. Cons. Engr., Penn. Lines W. of Pitts., Pittsburg, Pa.		Sept. 5, 1877

		Date of Membership.
Johnson, Wallace Clyde. Chf. Engr., Niagara Falls Hydr. Power & Mfg. Co., and Shawenegan Water & Power Co.; Cons. Engr., Niagara Falls, N. Y. (also 1724 Notre Dame St., Montreal, Que., Canada)		Oct. 5, 1892
Johnston, Albert William. Gen. Supt., N. Y., C. & St. L. R. R. Co., 424 Hickox Bldg., Cleveland, Ohio		Mar. 6, 1895
Johnston, Horace Greeley. Gen. Mgr., Am. Well & Prospecting Co., Corsicana, Tex		Sept. 7, 1887
Johnston, John Howard. Care, Backus & Johnston, Lima, Peru		Mar. 1, 1876
Jonah, Frank Gilbert. Chf. Engr., St. L., Brownsville & Mex. Ry., Corpus Christi, Tex		Nov. 4, 1903
Jones, Washington. Con. Mech. Engr., 1632 North 15th St., Philadelphia, Pa		Oct. 7, 1874
Jordan, Edward Clarence. Civ. and Hydr. Engr., 31½ Exchange St., Portland, Me		May 7, 1890
Judson, Charles Albert. Secy. and Treas., The Erie County Investment Co., Sandusky, Ohio		Jan. 3, 1894
Judson, William Pierson. Deputy State Engr. of New York, Albany, N. Y		Sept. 7, 1881
Judson, William Voorhees. Capt., Corps of Engrs., U. S. A., Office of the Chf. of Engrs., Washington, D. C		Nov. 4, 1896
Juengst, Henry Frederick. Care, Birmingham Water-Works Co., Birmingham, Ala		April 2, 1884
Just, George Alexander. Cons. Engr., 452 Fifth Ave., New York City	Jun. M.	Sept. 3, 1884 Mar. 4, 1891
Kadono, Chokuro. Engr. and Mgr., Okura & Co , 53 New Broad St., London, E. C., England		Jan. 8, 1902
Kareischa, Serge de. Prof. of the Imperial Inst. of Engrs. of Ways and Communications; Asst. Gen. Mgr., Traffic Dept., Board of Direction, Russian Rys.; Pres., Assoc. of M. of W. Engrs., Russian Ry., Zagorodny prosp. No. 70, log 4, St. Petersburg, Russia.		June 6, 1894
Kastl, Alexander Edward. Chf. Engr., The Denver Union Water Co., 1654 Broadway, Denver, Colo	Jun. M.	Jan. 4, 1888 Nov. 5, 1890
Katte, Walter. Cons. Engr., Irvington, N. Y		Oct. 7, 1868
Kaufman, Gustave. Engr. and Mgr., The Wilson & Baillie Mfg. Co., 26 Court St., Brooklyn, N. Y		May 7, 1890
Keating, Edward Henry. Mgr., Toronto Ry. Co., Toronto, Ont., Canada		June 7, 1882
Keefer, George Alexander. Res. Engr., Dominion Public Works in B. C., New Westminster, B. C., Canada		Jan. 2, 1889
KEEFER, THOMAS COLTRIN. (*Past-President*). Ottawa, Ont., Canada		April 4, 1877
Keene, William Faitoute. City Engr., Central Falls, R. I	Assoc. M. M.	June 3, 1896 May 1, 1901
Keith, George Thomas. Civ. and Hydr. Engr., Olean, N. Y		May 4, 1881
Keith, Herbert Cary. Chf. Engr., Eastern Div., MacArthur Bros. Co., Hanover Bank Bldg., New York City		Dec. 4, 1889

		Date of Membership.
Keller, Charles. Capt., Corps of Engrs., U. S. A., Manila, Philippine Islands		Mar. 7, 1900
Kelley, Howard George. Chf. Engr., Minn. & St. L. R. R. and Iowa Cent. Ry., 1124 Guaranty Bldg., Minneapolis, Minn		May 1, 1889
Kelley, William Datus. Engr., Bldr. and Contr. (Kelly & Kelley), 45 East 42d St., New York City		Nov. 2, 1887
Kellogg, Charles. Pres., Imperial Pneumatic Tool Co., Athens, Pa.		June 2, 1880
Kellogg, Norman Benjamin. 420 California St., San Francisco, Cal	Jun. M.	Feb. 6, 1878 July 3, 1895
Kelly, Cassius William. City Engr., 17 City Hall, New Haven, Conn	Jun. M.	Mar. 1, 1882 June 6, 1888
Kendrick, John William. Third Vice-Pres., A., T. & S. F. Ry. System, 77 Jackson St., Chicago, Ill		June 6, 1883
Kendrick, Julian Way. City Engr., Birmingham, Ala., and Chf. Engr., Jefferson Co. (Ala.) San. Comm		Oct. 1, 1902
Kenly, William Lacy. Lake Montebello, Baltimore, Md		Nov. 7, 1894
Kenly, William Watkins. Treas. and Gen. Mgr., U. S. Mortar Supply Co., 1123 Broadway, New York City		Nov. 6, 1889
Kennedy, James Henry. Chf. Engr., Vancouver, Victoria & East. Ry. & Nav. Co., St. Thomas, Ont., Canada		May 2, 1900
Kennedy, Jeremiah Joseph. Cons. Engr., 52 Broadway, New York City.		June 4, 1902
Kennedy, John. Chf. Engr., Harbor Commrs., Montreal, Que., Canada		Sept. 1, 1875
Kennedy, William Harlin. Chf. Engr., The Ore. R. R. & Nav. Co., Portland, Ore		Sept. 6, 1871
Kernot, William Charles. Prof. of Eng., Univ. of Melbourne, Melbourne, Victoria, Australia		Mar. 6, 1889
Kerr, Frank Montgomery. Mem., Board of State Engrs. of La., Cotton Exchange Bldg., New Orleans, La		Oct. 2, 1901
Kerr, Luther Yager. U. S. Junior Engr., Box 204, Memphis, Tenn.		June 4, 1902
Khuen, Richard. Res. Engr., Am. Bridge Co., Ambridge, Pa	Jun. Assoc. M. M.	Dec. 3, 1891 May 1, 1895 Nov. 2, 1898
Kielland, Soren Theodor Munch Bull. Civ. Engr., Buffalo Creek R. R.; Office, 364 Ellicott Sq., Buffalo, N. Y		Feb. 6, 1889
Kiersted, Wynkoop. Cons. Engr., 58 Water-Works Bldg., Kansas City, Mo.		Oct. 5, 1887
Kimball, Frank Clifton. Supt. and Res. Engr., Knoxville Water Co., Knoxville, Tenn		June 3, 1903
Kimball, George Albert. Chf. Engr., Elev. Lines, Bost. Elev. Ry. Co., 101 Milk St., Boston, Mass	Jun. M.	May 12, 1875 July 1, 1891
Kimball, George Henry. Cons. Engr., 1064 Ellicott Sq., Buffalo, N. Y. (Res., 72 Delaware Ave., Detroit, Mich.)		Dec. 3, 1890
Kinder, Claude William. Engr. in Chf. and Supt., Imperial Chinese Rys., Tientsin, China		June 4, 1890
King, Charles Cyrus. Chf. Engr., C. W. Hunt Co., West New Brighton, Richmond Co., N. Y		Sept. 2, 1891
King, Paul Sourin. Cons. Engr., 25 West 23d St., New York City		July 3, 1889

		Date of Membership.
King, William Byrd. Gen. Mgr., Fort Worth Stock Yards Co. and Fort Worth Belt Ry. Co., Fort Worth, Tex		Oct. 7, 1896
King, Winfield Scott. Chf. Engr. and Supt., Motive Power, Union Stock Yards & R. R. Co., South Omaha, Nebr		Dec. 6, 1899
Kingman, Lewis. Chf. Engr., Mex. Cent. Ry., City of Mexico, D. F., Mexico		July 1, 1885
Kingsley, Marvin Watson. Civ. and Hydr. Engr., 1022 Rose Bldg., Cleveland, Ohio		July 3, 1878
Kinney, Edward Cornelius. Gen. Mgr., West Gallatin Irrig. Co., Bozeman, Mont		May 3, 1882
Kinsley, Thomas Pearson. 157th St. and Broadway, New York City.		Feb. 5, 1873
Kirkpatrick, Walter Gill. Civ. and Mech. Engr. (Kirkpatrick & Johnson); City Engr., Jackson, Miss.	Assoc. M. M.	April 6, 1892 Oct. 5, 1898
Kittredge, George Watson. Chf. Engr. of The C., C., C. & St. L. Ry. Co., Cincinnati, Ohio		Jan. 6, 1886
Kittrell, James Wesson. Smith's Landing, Greene Co., N. Y		Sept. 1, 1897
Klapp, Eugene. Div. Engr., Rapid Transit R. R. Commrs., 231 West 125th St., New York City		Feb. 6, 1901
Kleinbeck, August Gustave. 710 North State St., Litchfield, Ill		Feb. 3, 1897
Kluegel, Charles Henry. Chf. Engr., Oahu Ry. & Land Co., P. O. Box 796, Honolulu, Hawaii		Oct. 1, 1902
KNAP, JOSEPH MOSS. (*Treasurer*). 220 West 57th St., New York City		April 5, 1882
Knapp, Louis Henry. Civ. and Hydr. Engr., 280 Linwood Ave., Buffalo, N. Y		Mar. 4, 1874
Knickerbacker, John. Pres., Eddy Valve Co. of Waterford, N. Y.; Res., 86 First St., Troy, N. Y		Jan. 2, 1900
Knight, Walter Harris. Care, Am. & British Mfg. Co., Providence, R. I.		Feb. 1, 1893
Knowles, Morris. Filtration Engr., Dept. of Public Works, Pittsburg; Civ. and Cons. Engr. (Chapin & Knowles), 1017 Frick Bldg., Pittsburg, Pa	Jun. Assoc. M. M.	Oct. 4, 1892 Jan. 1, 1896 April 1, 1903
Kondo, Sentaro. Doboku Kantokusho, Tokyo, Japan		Nov. 7, 1900
Kondo, Toragoro. Chf. Engr., Home Dept., Tokyo, Japan	Jun. M.	Oct. 3, 1888 June 5, 1901
Kops, Julian de Bruyn. Civ. Engr. and Archt., 18 Board of Trade Bldg., Savannah, Ga	Assoc. M. M.	April 4, 1894 Jan. 5, 1904
Kuersteiner, Emil Edward. Asst. Engr., L. & N. R. R., 1954 Floyd St., Louisville, Ky		Dec. 1, 1897
Kuichling, Emil. Cons. Engr., 209 Clinton Ave., North, Rochester, N. Y		Sept. 3, 1884
Kunz, Frederic Charles. Cons. Engr., Dept. of Bridges, New York City.	Assoc. M. M.	Feb. 6, 1895 Dec. 7, 1898
Kutz, Charles Willauer. Capt., Corps of Engrs, U. S. A., 2117 O St., N. W., Washington, D. C		May 7, 1902
Labelle, Henry Francis. Civ. and Hydr. Engr., 1109 Betz Bldg., Philadelphia, Pa		April 6, 1898

		Date of Membership.
La Chicotte, Henry Arthur. Engr. in Chg. Manhattan Bridge (No. 3) and Blackwell's Island Bridge (No. 4), Dept. of Bridges, New York City		Oct. 3, 1894
Lamb, Richard. Cons., Civ., Elec. and Min. Engr., 136 Liberty St., New York City	Assoc. M. M.	May 6, 1891 June 6, 1900
Landon, Eugene Ashbel. Vice-Pres. and Mgr., Groton Bridge Co., Groton, Tompkins Co., N. Y.		April 1, 1896
Landor, Edward John. Civ. and Contr. Engr., 1244 N. Cleveland Ave., Canton, Ohio		Mar. 7, 1888
Landreth, Olin Henry. Prof. of Eng., Union Coll.; Cons. Engr., Schenectady, N. Y.		Sept. 3, 1884
Landreth, William Barker. Res. Engr., Eastern Div., New York State Canals, State Hall, Albany, N. Y.		Oct. 3, 1888
Lange, Gunardo Aufin. Care, Fr. J. Morison, Casilla de Correa No. 1098, Buenos Aires, Argentine Republic		Mar. 3, 1897
Langton, John. 99 John St., New York City		May 2, 1900
Lansing, Edward Ten Eyck. City Engr., Little Falls, N. Y		Sept. 3, 1902
Larsson, Carl Gustaf Emil. Asst. Chf. Engr., Am. Bridge Co., Ambridge, Pa.		April 1, 1903
Latcha, Jacob Albert. Coldwater, Mich.		May 7, 1873
Laub, Hermann. 610 Lewis Blk., Pittsburg, Pa.		Sept. 1, 1897
Lawlor, Francis Denis Hubert. Citizens Water Co., Burlington, Iowa	Jun. M.	Oct. 6, 1886 Mar. 6, 1895
Lawton, William Henry. City Engr., 24 Bellevue Ave., Newport, R. I.		June 2, 1886
Lea, Samuel Hill. Cons. Engr., 305 Title Guarantee Bldg., Birmingham, Ala.		Nov. 3, 1897
Leavitt, Erasmus Darwin. Mech. Engr., 2 Central Sq., Cambridge, Mass.		July 2, 1873
Leavitt, Frank McDowell. Mech. Engr., 258 Broadway, New York City		Dec. 2, 1885
Le Baron, John Francis. Cons. Engr.; Pres., Brookside Medicinal Plantation Co., 1329 Williamson Bldg., Cleveland, Ohio.		June 7, 1882
Le Conte, Louis Julian. U. S. Asst. Engr. in Chg., Oakland Harbor Works (P. O. Box 482), Oakland, Cal.		April 4, 1877
Lederle, George Anthony. 171 La Salle St., Chicago, Ill.	Jun. M.	May 2, 1883 Oct. 6, 1886
Ledlie, Charles Hees. Cons. Engr., 918 Rialto Bldg., St. Louis, Mo.		Jan. 4, 1888
Ledoux, John Walter. Chf. Engr., The Am. Pipe Mfg. Co. and The National Gas & Constr. Co., 112 North Broad St., Philadelphia, Pa.		June 5, 1895
Lee, Edward Hervey. Engr. and Gen. Roadmaster, Chic. & W. Indiana R. R. and Belt Ry. of Chicago, Room 45, Dearborn Station, Chicago, Ill.		June 6, 1900
Lee, Wellington Barnes. Travelling Representative, Ramapo Iron Works, Hillburn, Rockland Co., N. Y.	Assoc. M. M.	Feb. 5, 1896 May 4, 1898
Leffingwell, William Howland. Min. Engr., U. S. Deputy Mineral Surv., Lake City, Hinsdale Co., Colo		Oct. 4, 1893
Lehlbach, Gustav. 770 Broad St., Newark, N. J.		Mar. 7, 1883

		Date of Membership.
Lehnartz, Frederick William. U.S. Asst. Engr., Grand Rapids, Mich.		Aug. 6, 1879
Leisen, Theodore Alfred. Cons. Engr.; Chf. Engr., Water Dept., Wilmington, Del.		June 2, 1897
Leland, George Herbert. 930 Banigan Bldg., Providence, R. I.	Jun. M.	Mar. 2, 1887 Feb. 1, 1893
Leland, Warren Allston. U. S. Asst. Engr., Moultrieville, S. C.		Oct. 3, 1900
Leonard, Henry Read. Engr. of Bridges, P. R. R., 660 Broad St. Station, Philadelphia, Pa.		April 4, 1894
Leverich, Gabriel. 373 Stuyvesant Ave., Brooklyn, N. Y.		July 6, 1870
Lewinson, Maxymilian. 128 West 42d St., New York City		Feb. 7, 1894
LEWIS, EUGENE CASTNER. (*Director*). Gen. Mgr., Sycamore Powder Mills; Pres., L. & N. Terminal Co., Nashville, Tenn.		Mar. 5, 1873
Lewis, Everett Wilson. Asst. Engr., N. P. Ry., St. Paul, Minn.		Sept. 4, 1901
Lewis, Frederick Humphreville. Mgr., Virginia Portland Cement Co., Craigsville, Va.		Jan. 6, 1897
LEWIS, NELSON PETER. (*Director*). Chf. Engr., Board of Estimate and Apportionment, City Hall, New York City		Oct. 2, 1895
Lewis, Sidney Francis. State Engr., 4th Floor, Room 2, Cotton Exchange Bldg., New Orleans, La.		May 4, 1881
Lieb, John William, Jr. Third Vice-Pres. and Assoc. Gen. Mgr., The New York Edison Co., 55 Duane St. (Res., 869 West End Ave.), New York City		Oct. 5, 1898
R. **Lindenthal, Gustav.** 45 Cedar St., New York City		May 3, 1882
Linton, Harvey. City Engr., Altoona, Pa.		Oct. 5, 1892
Linville, Jacob Hays. Cons. Engr., 117 South 38th St., Philadelphia, Pa.		Mar. 3, 1875
Lippincott, Joseph Barlow. Superv. Engr., U. S. Reclamation Service, 408 Byrne Bldg., Los Angeles, Cal.		Dec. 6, 1899
List, Charles. 628 Sutter St., San Francisco, Cal.		June 3, 1903
Llewellyn, Francis John. Asst. to Vice-Pres., Am. Bridge Co. of N. Y., 1315 Monadnock Blk., Chicago, Ill.		Nov. 4, 1896
Locke, Charles Abbott. Nashville, Tenn.		Oct. 3, 1888
Locke, Franklin Buchanan. City Engr., North Adams, Mass.		Mar. 1, 1893
Lockwood, James Button Clyde. Cons. Engr., 322 Walker Bldg., Seattle, Wash.		Mar. 6, 1901
Lockwood, Judd Allen. Asst. Engr., Dept. of Bridges, 600 Lenox Ave., New York City		April 4, 1899
Lofland, Henry Fiddeman. Div. Erecting Mgr., Am. Bridge Co. of N. Y., Pencoyd, Pa.		June 2, 1897
Long, Thomas John. Vice-Pres., Atlantic, Gulf & Pacific Co., Civ. Engrs. and Contrs., Park Row Bldg., New York City.	Jun. M.	Nov. 3, 1875 Jan. 7, 1880
Loomis, Horace. Chf. Engr., Dept. of Sewers, Borough of Manhattan, 13 Park Row, New York City		Nov. 5, 1879
Loomis, Thomas Hooker. Div. Engr. (Ohio Div.), Pitts., Carnegie & West. R. R., Steubenville, Ohio		Jan. 7, 1903
Loree, Leonor Fresnel. B. & O. Central Bldg., Baltimore, Md.		Oct. 6, 1886
Low, Emile. U. S. Asst. Engr., U. S. Engr. Office, Federal Bldg., Buffalo, N. Y.		May 2, 1888

		Date of Membership.
Lowe, Jesse. (Christie & Lowe, Civ. Engrs. and Contrs.), 171 La Salle St., Chicago, Ill.		Oct. 2, 1895
Loweth, Charles Frederick. Engr. and Supt., Bridges and Bldgs., C., M. & St. P. Ry., 192 Fullerton Ave., Chicago, Ill.	Jun. M.	Jan. 3, 1883 Feb. 6, 1884
Lowrie, Harvey Childs. Pres., The Lowrie Safe & Lock Co., 118 West Jackson Boulevard, Chicago, Ill.		Mar. 2, 1892
Lucas, Daniel Jones. Asst. Engr., Dept. Public Works, Bureau of Filtration of the Water Supply, 710 City Hall, Philadelphia, Pa.	Jun. M.	Sept. 6, 1876 July 4, 1888
Lucas, Eugene Willett Van Court. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Randolph Bldg., Memphis, Tenn.	Assoc. M. M.	April 3, 1895 Sept. 5, 1900
Lucius, Albert. 38 Park Row, Room 137, New York City.		Mar. 3, 1886
Ludlow, Jacob Lott. Cons., Municipal, San. and Hydr. Engr., Winston-Salem, N. C.		Mar. 3, 1897
Lum, David Walker. Asst. Gen. Supt., Maintenance, Southern Ry. Co., Washington, D. C.		May 3, 1893
Lundie, John. Cons. Engr., 52 Broadway, New York City.		July 4, 1888
Lusk, James Loring. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Rock Island, Ill.		Mar. 4, 1891
Luster, William Henry, Jr. City Surv., City Hall, Elizabeth, N. J.	Assoc. M. M.	Oct. 3, 1900 April 2, 1902
Lydon, William Anthony. Pres., Chicago & Great Lakes Dredge & Dock Co., Chamber of Commerce, Chicago, Ill.	Jun. M.	Jan. 4, 1888 Dec. 5, 1894
Lynch, Michael Lehane. Chf. Engr., St. Louis S. W. System, Tyler, Tex.		May 4, 1892
Lyon, Henry Lloyd. Deputy Water Commr., Municipal Bldg., Buffalo, N. Y.		Feb. 3, 1904
Lyons, James Knox. Asst. Div. Engr., Am. Bridge Co., Ambridge, Pa.; Address, Dorset Hotel, Pittsburg, Pa.	Assoc. M. M.	May 1, 1895 Oct. 5, 1898
MacAllister, Dickinson. Pres., The Met. West Side Elev. Ry. Co., 1001 Royal Insurance Bldg., Chicago, Ill.		April 1, 1896
Macdonald, Charles. 2 Wall St., New York City.		Sept. 15, 1869
MacFarlane, James. Room 509, McPhee Bldg., Denver, Colo.		April 4, 1888
Mackall, Benjamin Franklin. Chf. Asst. Engr., S. A. L. R R., Portsmouth, Va.		Mar. 6, 1901
Mackenzie, Alexander. Brig.-Gen., Chf. of Engrs., U. S. A., Washington, D. C.		Feb. 2, 1887
Mackenzie, William Brouard. Chf. Engr., Intercolonial Ry., Moncton, N. B., Canada.	Jun. M.	June 7, 1882 April 3, 1901
N. Maclay, William Walter. Cons. Engr., Glens Falls, N. Y.		Nov. 6, 1872
Maclennan, John Donald. Vice-Pres. and Cons. Engr. of New York Tunnel Co., Garfield Bldg., Cleveland, Ohio		Oct. 4, 1899
MacNaughton, James. Pres. of MacIntyre Iron Co., Tahawus, Essex Co., N. Y.		May 5, 1880

Member	Grade	Date of Membership.
MacRitchie, Charles. 21 Quincy St., Chicago, Ill.	Assoc. M.	Oct. 2, 1872 April 5, 1876
McCalla, Richard Calvin. U. S. Asst. Engr., Tuscaloosa, Ala.	Jun. Assoc. M. M.	July 2, 1890 Sept. 2, 1891 Dec. 5, 1894
McCann, Thomas Henry. Second National Bank Bldg., Hoboken, N. J. (also Care, North River Bridge Co., 45 Cedar St., New York City)		April 2, 1890
McCarty, Richard Justin. 3820 Warwick Boulevard, Kansas City, Mo.		Dec. 4, 1895
McClintock, J. Y. County Engr. of Monroe County, Rochester, N. Y.		Oct. 2, 1895
McClintock, William Edward. Chairman, Mass. Highway Comm., 20 Pemberton Sq., Boston, Mass.		Dec. 5, 1888
McCollom, Thomas Chalmers. 4606 Springfield Ave., Philadelphia, Pa.		May 3, 1882
McComb, Charles Oscar. City Engr. and Engr. of Water Board, Watertown, N. Y.		May 2, 1900
McComb, David E. Supt. of Sewers, Washington, D. C.		Feb. 7, 1877
McConnel, Wilfred Gillette. Asst. Mgr., Cuba Eastern R. R. Co., Guantanamo, Cuba		June 3, 1903
McCool, Daniel. Pres., Newaygo (Mich.) Portland Cement Co., Pres., Grand Rapids Edison Co., Grand Rapids, Mich.		Sept. 5, 1883
McCormick, George King. Roadmaster, A. K. & N. Ry., Blue Ridge, Ga.	Jun. M.	Feb. 6, 1889 May 4, 1898
McCormick, Robert Hugh. City Engr., Detroit, Mich.		Sept. 7, 1898
McCulloh, Ernest. Chf. Engr., Yakima Development Co., North Yakima, Wash.		May 6, 1903
McCulloh, Walter. City Engr., Niagara Falls, N. Y.	Jun. M.	July 4, 1888 June 7, 1893
McCurdy, John Egbert. Apartado 2217, City of Mexico, Mexico.		April 1, 1896
McDONALD, HUNTER. (*Director*). Chf. Engr., N., C. & St. L. Ry., Nashville, Tenn.	Jun. M.	April 4, 1883 Mar. 7, 1888
McDonald, John Alexander. Care, James E. McDonald, 4 Chapel St., Cripplegate, London, E. C., England		Feb. 5, 1890
McDonald, William Naylor. Chf. Engr., Tenn. Central R. R. Co., Nashville, Tenn.		Sept. 3, 1902
McGrath, Wallace. 1112 Tennessee St., Lawrence, Kans.		Sept. 5, 1883
McGrew, Anson Burlingame. U. S. Supt., Beaver, Pa.		June 4, 1902
McHenry, Edwin Harrison. Chf. Engr., Canadian Pacific Ry., Montreal, Que., Canada		Feb. 5, 1896
McKay, John Edwards. Prin. Asst. Engr., Dept., Water Supply, Gas and Electricity, 13 Park Row, New York City.		July 5, 1893
McKeen, Benjamin. Gen. Mgr., Vandalia Lines, 806 Century Bldg., St. Louis, Mo.		Nov. 6, 1895
McKenzie, Theodore Hall. Engr., State Board of Health; Mem., State Board of Civ. Engrs., 40 Stearns Bldg., Hartford, Conn.		Sept. 7, 1881
McKeown, Thomas. 19 Winspear Ave., Buffalo, N. Y.		Dec. 3, 1879
McKim, Alexander Rice. Archt. and Engr., 36 East 28th St., New York City	Assoc. M. M.	April 4, 1894 May 4, 1898

		Date of Membership.
McKim, James Arthur. Vice-Pres. and Gen. Mgr., Noelke-Richards Iron Works (Res., 2150 North Meridian St.), Indianapolis, Ind.		Oct. 2, 1901
McKinstry, Charles Hedges. Capt., Corps of Engrs., U. S. A., U. S. Engr. Office, Los Angeles, Cal.	Assoc. M. M.	Sept. 2, 1896 May 3, 1899
McLain, Louis Randolph. Pres., Florida Eng. Co., St. Augustine, Fla.		Feb. 2, 1881
McLaughlin, John Joseph. County Engr., Queens Co., Jamaica, N. Y.		Nov. 1, 1893
McLean, Archibald. Engr. in Chg., Brooklyn Bridge, 179 Washington St., Brooklyn, N. Y.		May 6, 1903
McMath, Robert Emmet. Pres. of R. E. McMath Surveying Co., 328 Lincoln Trust Bldg., St. Louis, Mo.		Mar. 3, 1880
McMillan, Charles. Prof. of Civ. Eng. and Applied Math., Princeton Univ., Princeton, N. J.		Jan. 29, 1868
McMinn, Thomas James. (*Assistant Secretary*). 220 West 57th St., New York City		Mar. 5, 1890
McNeal, John, Jr. Asst. Engr., Lehigh Coal & Nav. Co., 507 Drake Bldg., Easton, Pa.		Dec. 2, 1903
McNicol, John Alexander. Care, Snare & Triest, 39 Cortlandt St., New York City		Sept. 1, 1897
McNulty, George Washington. 258 Broadway, New York City		May 5, 1880
McVean, John Jay. Cons. Engr., 16 State St., Grand Rapids, Mich.		Sept. 3, 1884
Mais, Henry Coathupe. Prell's Bldgs., 60 Queen St., Melbourne, Victoria, Australia		June 6, 1883
Maitland, Alexander, Jr. 1109 McGee St., Kansas City, Mo.		Nov. 6, 1901
Maltby, Frank Bierce. Asst. Engr., Supt., Dredging Operations, Mississippi River Comm., Memphis, Tenn.		April 3, 1895
Man, Albon Platt. Gen. Mgr., The Arminius Chemical Co., Mineral, Va.		Sept. 5, 1883
Manley, Henry. Asst. Engr., Eng. Dept., Room 52, City Hall, Boston, Mass.		June 2, 1880
Manning, William Thurston. Cons. Engr., 518 Equitable Bldg., Baltimore, Md.		Feb. 5, 1896
Mansfield, Martin William. Supt., Penn. Lines, Indianapolis, Ind.		July 5, 1882
Manson, Marsden. Cons. Engr., Univ. Club, San Francisco, Cal.		Sept. 6, 1882
Marburg, Edgar. Prof. of Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa.		Oct. 6, 1897
Marden, Henry Herman, Jr. With United Eng. & Contr. Co., 13 Park Row, New York City		May 1, 1901
Marindin, Henry Louis. Asst., U. S. Coast and Geodetic Survey, Washington, D. C.		May 7, 1884
Marple, William McKelvey. Engr., The Scranton Gas & Water Co., The Dunmore Gas & Water Co., The Olyphant Water Co., The Archbald Water Co., Scranton, Pa.		June 4, 1890
Marr, George Anson. U. S. Asst. Engr. and Supt., Portage Lake Ship Canals, Mich., Houghton, Mich.		Oct. 3, 1883
Marshall, Horace Miller. Asst. Engr., U. S. Engr. Office, Vicksburg, Miss.		Dec. 3, 1890

		Date of Membership.
Marston, Anson. Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa.	Assoc. M. M.	Oct. 4, 1893 Oct. 7, 1903
Marstrand, Otto Julius. Mgr., Atlas Co., Ltd., Hopetoun House, Lloyds Ave., London, E. C., England.		May 7, 1890
Martin, Kingsley Leverich. Asst. Engr., Dept. of Bridges, New York City, 84 Broadway, Brooklyn, N. Y	Jun. Assoc. M. M.	Nov. 5, 1895 May 3, 1899 Dec. 1, 1903
Martin, William. U. S. Asst. Engr., 14 Sprague Ave., Bellevue, Pa.		Jan. 7, 1903
Martin, Wisner. Prin. Asst. Engr., Bureau of Highways for Manhattan, Park Row Bldg., New York City.	Jun. Assoc. M. M.	May 3, 1892 July 3, 1895 May 1, 1901
Marvin, Frank Olin. Prof. of Civ. Eng. and Dean of School of Eng., Univ. of Kansas; Engr., State Board of Health, Lawrence, Kans.		May 5, 1897
MARX, CHARLES DAVID. (*Director*). Prof. of Civ. Eng., Leland Stanford, Jr., Univ.; Cons. Engr., Stanford University, Santa Clara Co., Cal.		Oct. 7, 1896
Mason, Arthur John. Contr. Engr. (Hoover & Mason), Chicago, Ill.		Sept. 5, 1888
Mason, Sampson Douglas. Junior Engr., U. S. Fortification Work, Fort Casey, Island Co., Wash.		Oct. 6, 1886
Matcham, Charles Arthur. Mgr., Lehigh Portland Cement Co., Allentown, Pa.		June 5, 1901
Mather, Thomas Hoggan. Chf. Engr., Syracuse R. R. Constr. Co., Onondaga County Savings Bank Bldg., Syracuse, N. Y.		Oct. 1, 1902
Matheson, Donald Alexander. Engr., Caledonian Ry, Buchanan St. Station, Glasgow, Scotland.		Oct. 7, 1903
Maurice, Charles Stewart. Athens, Pa.		May 15, 1872
Maury, Dabney Herndon. Cons. Engr., 129 North Jefferson Ave., Peoria, Ill.		May 3, 1899
Maxim, Hiram Stevens. Care, Reginald Crosse, 7 Lancaster Pl., Strand, London, England.		Oct. 7, 1885
Maxson, Frank Oscar. Civ. Engr., U. S. N, Cavite, Philippine Islands		May 1, 1889
Maxwell, James Riddle. Cons. Engr., Newark, Del		April 17, 1872
May, DeCourcy. Pres., New York Shipbuilding Co., Camden, N. J. (Res., 12th and Spruce Sts., Philadelphia, Pa.).		Mar. 6, 1895
May, William Andrew. Gen. Mgr., Hillside Coal & Iron Co., Box 553, Scranton, Pa.		July 6, 1881
Mayer, Joseph. 1 Broadway, New York City.		Oct. 3, 1894
Mayne, Charles. Municipal Engr., Kiangse Rd., Shanghai, China.		Jan. 1, 1896
Mead, Charles Adriance. 165 Wildwood Ave., Upper Montclair, N. J.	Assoc. M. M.	April 5, 1899 Jan. 5, 1904
Mead, Daniel Webster. Cons. Hydr. Engr., 738 First National Bank Bldg., Chicago, Ill.	Assoc. M. M.	July 1, 1891 Dec. 6, 1893
MEAD, ELWOOD. (*Director*). Chf., Irrig. Investigations, U. S. Dept. Agriculture, Washington, D. C.		June 7, 1893
Meigs, Montgomery. U. S. Civ. Engr., Office, U. S. Des Moines Rapids Canal, Keokuk, Iowa.		Mar. 5, 1879

		Date of Membership.
Melcher, Frank Otis. Div. Supt., Ill. Div., C., R. I. & P. Ry., Chicago, Ill.		Mar. 3, 1897
Melliss, David Ernest. Cons. Civ. and Min. Engr., 208 California St., San Francisco, Cal.		Oct. 2, 1895
Melvin, David Neilson. Supt. and Engr., Am. Linoleum Mfg. Co., Linoleumville, N. Y.		July 3, 1878
Menocal, Aniceto G. Civ. Engr., U. S. N. (*Retired*); Cons. Engr., 251 West 81st St., New York City		Feb. 3, 1875
Mercer, Charles Hatton. Asst. Engr. of Constr., Bridge and Constr. Dept., The Pennsylvania Steel Co., Steelton, Pa.	Assoc. M. M.	Nov. 3, 1897 May 1, 1901
Merrill, George Nathan. Civ. and Cons. Engr. (Geo. N. Merrill & Co.), 292 Main St., Room 7, Springfield, Mass.		May 1, 1889
Merrill, William Fessenden. First Vice-Pres., N.Y., N. H. & H. R. R., New Haven, Conn.		April 1, 1874
Merriman, Mansfield. Prof. of Civ. Eng., Lehigh Univ., South Bethlehem, Pa.	Jun. M.	May 12, 1875 Sept. 3, 1884
Merryman, William Curtis. Res. Engr., 3d Div., Rapid Transit Subway Constr. Co., 1913 Amsterdam Ave. (Res., 562 West 149th St.), New York City		Oct. 4, 1899
Mersereau, Charles Vernon. Asst. Engr., Water-Works Extension, 77 E. May St., St. Louis, Mo.		Dec. 3, 1884
Metcalf, Leonard. Hydr. and San Engr., 14 Beacon St., Boston, Mass.	Assoc. M. M.	Jan. 5, 1898 Sept. 2, 1903
R. METCALF, WILLIAM. (*Past-President*). 1 Fulton St., Pittsburg, Pa.		July 2, 1873
Meyer, Rudolf. With Compañia Fundidora de Fierro y Acero, Apartado 55, Monterey, Mexico		Oct. 5, 1898
Meyer, Thomas C. 13 East 48th St., New York City		Dec. 7, 1852
Michell, Theophilus. Care, H. S. King & Co., 65 Cornhill, London, England		Jan. 2, 1901
Miller, Alexander Macomb. Lt.-Col., Corps. of Engrs., U. S. A., Office, Washington Aqueduct, 2728 Pennsylvania Ave., Washington, D. C.		June 6, 1888
Miller, Charles Henry. Engr. with McClintic-Marshall Const. Co. at Rankin, Pa.; Address, 727 East End Ave., Pittsburg, Pa.		May 2, 1899
Miller, Edward Furber. Assoc. Prof. of Steam Eng., Mass. Inst. Tech., Boston, Mass.		June 3, 1903
Miller, Harvey Cooper. (H. C. Miller & Co., Engrs. and Contrs.), 68 Beaver St., New York City		June 5, 1901
Miller, Hiram Allen. Chf. Engr., Charles River Basin Comm., 367 Boylston St., Boston (Res., 15 Duncklee St., Newton Highlands), Mass.		May 6, 1896
Miller, Rudolph Philip. 141 East 40th St., New York City	Jun. Assoc. M. M.	Jan. 2, 1890 April 7, 1897 Jan. 5, 1904
Miller, Spencer. Chf. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City	Assoc. M.	July 3, 1889 Nov. 7, 1894
Millis, John. Maj. of Engrs., U.S.A., U. S. Engr. Office, Seattle, Wash.		Mar. 7, 1900

		Date of Membership.
Mills, Arthur Lorenzo. Vice-Pres., The Paddock Hodge Co., 2132 Glenwood Ave., Toledo, Ohio		May 2, 1888
Mills, Charles Malon. Prin. Asst. Engr., Subway and Elev. Ry. Constr., Phil. Rap. Trans. Co., 9th and Dauphin Sts., Philadelphia, Pa	Jun. M.	June 2, 1886 Sept. 3, 1890
Miner, Charles Augustine. U. S. Asst. Engr., Wilmington, Del	Assoc. M. M.	April 7, 1897 Dec. 4, 1901
Mitchell, Charles Hamilton. Asst. Engr., Ontario Power Co., Niagara Falls, Ont., Canada	Assoc. M. M.	June 4, 1902 Jan. 5, 1904
Mitchell, Samuel Phillips. Chf. Engr., Am. Bridge Co. of N. Y., N. W. cor. 15th and Chestnut Sts., Philadelphia, Pa		April 1, 1903
Mixer, Charles Adam. Engr., Rumford Falls Power Co., Rumford Falls, Me		Nov. 1, 1893
MODJESKI, RALPH. (*Director*). Cons. Engr., 1742 Monadnock Bldg., Chicago, Ill	Jun. Assoc. M. M.	Dec. 1, 1886 July 1, 1891 Mar. 3, 1897
Mogensen, Olaf Einar. Structural Engr., Chf. Engr.'s Office, Mo. Pac. Ry. Co. (St. L., I. M. & S. Ry. Co., Leased and Operated Lines), 502 Missouri Pacific Bldg., St. Louis, Mo	Assoc. M. M.	April 7, 1897 Sept. 2, 1903
Mohun, Edward. Union Club, Victoria, B. C., Canada		April 6, 1892
Molitor, David Albert. Civ. and Cons. Engr., 125 Park Ave., Fond du Lac, Wis		Oct. 6, 1897
Molitor, Frederic Albert. Chf. Engr., Cherokee Constr. Co., Fort Smith, Ark		Nov. 4, 1896
Moncrieff, Alexander Bain. Engr. in Chf., South Australia, Adelaide, South Australia		July 4, 1894
Moncrieff, John Mitchell. 1 St. Nicholas Bldgs., Newcastle-upon-Tyne, England		Nov. 3, 1897
Montfort, Richard. Chf. Engr., L. & N. R. R., Louisville, Ky.		June 6, 1888
Montgomery, John Alexander. Cons. Engr., Room 9, Office Bldg., First Ave., Birmingham, Ala		Jan. 1, 1896
Moody, Burdett. Civ. and Min. Engr. (Schnitzel & Moody), Lead (Black Hills), S. Dak.	Assoc. M. M.	Feb. 3, 1897 June 5, 1901
Moore, Charles Edward. Cons. Engr., Santa Clara, Cal		Jan. 7, 1880
Moore, Charles Harry. First Asst. Engr., Erie R. R.; Chic. & Erie R. R.; N. Y., P. & O. R. R.; N. Y., S. & W. R. R., 26 Cortlandt St., New York City	Assoc. M. M.	April 5, 1893 Sept. 4, 1901
Moore, James Edwin Alexander. Estimating Engr., The Wellman-Seaver-Morgan Co., Cleveland, Ohio		June 5, 1901
MOORE, ROBERT. (*Past-President*). Cons. Engr., Laclede Bldg., St. Louis, Mo		April 5, 1876
Moore, William Harley. Engr. of Bridges, N. Y., N. H. & H. R. R., New Haven, Conn		June 4, 1895
Moran, Daniel Edward. Foundation & Contr. Co., 35 Nassau St., New York City	Assoc. M. M.	June 3, 1891 Jan. 1, 1896
Mordecai, Augustus. Asst. Chf. Engr., Erie R. R., Cleveland, Ohio.		Feb. 1, 1893
Morley, Fred. Lapeer, Mich	Assoc. M. M.	May 6, 1891 Mar. 4, 1896

		Date of Membership.
Morrill, George Sullivan. Div. Engr., N. Y., N. H. & H. R. R. Co., Boston, Mass		Mar. 2, 1887
Morris, Charles John Augustus. Cons. Engr. and Contr., P. O. Box 254, St. Paul, Minn		Oct. 3, 1883
Morris, Henry Gurney. Engr. and Machinist, 408 Phila. Bourse, Philadelphia, Pa		Dec. 4, 1867
Morris, Marshall. Cons. Engr.; Pres., Breckinridge Asphalt Co., Room 303, Norton Bldg., Louisville, Ky		Mar. 5, 1873
Morrison, Henry Prentice. Broadway and Forest Ave., West New Brighton, N. Y		April 6, 1898
Morse, Benjamin Franklin. 729 Giddings Ave., Cleveland, Ohio		July 12, 1877
Morse, Charles Adelbert. Acting Chf. Engr., A., T. & S. F. Ry., 827 Harrison St., Topeka, Kans		April 6, 1898
Morse, Charles James. Care, Orient Coal & Coke Co., Uniontown, Pa.		Feb. 6, 1884
Morse, Charles Miller. Deputy Engr. Commr., Dept. of Public Works, Buffalo, N. Y		Jan. 2, 1895
Morse, Edwin Kirtland. Farmers National Bank Bldg., Pittsburg, Pa		June 6, 1900
Morton, Charles. Cons. Civ. Engr., 53 State St., Boston, Mass		Oct. 2, 1895
Mosman, Alonzo Tyler. Asst., U. S. Coast and Geodetic Survey, 189 Montague St., Room 205, Brooklyn, N. Y		July 1, 1885
Mosscrop, Alfred Mitton. Mgr., Constructional Dept., Dorman, Long & Co., Ltd., Middlesbrough, England	Jun. Assoc. M. M.	May 4, 1887 May 3, 1893 Oct. 4, 1899
Moulton, Mace. Cons. Engr., Springfield, Mass		June 4, 1884
Muenscher, Emory Washburn. Chf. Engr., Manistee & Grand Rapids R. R., Manistee, Mich		July 5, 1893
Münster, Andrew Wendelbo. Engr. of Bridges, C. G. W. Ry., St. Paul, Minn		May 1, 1889
Murakami, Kyoichi. 14 Wakamatsu-Cho, Osaka, Japan		Sept. 4, 1901
Myers, Charles Hayward. Aldrich Court, 45 Broadway, New York City		Aug. 5, 1868
Myers, Edmund Trowbridge Dana. Pres., Richmond, Fredericksburg & Potomac R. R. Co. and Washington Southern Ry. Co., Richmond, Va.		May 2, 1888
Myers, Edmund Trowbridge Dana, Jr. (Myers, Finney & Morrison), Richmond, Va	Jun. M.	May 2, 1888 June 7, 1899
Myers-Beswick, William Beswick. 14 Victoria St., Westminster, London, S. W., England		Jan. 3, 1894
Neale, John Colwell. Structural Engr. of Carnegie Steel Co., Pittsburg, Pa.		Jan. 7, 1903
Neher, Clarence Rufus. Engr. and Gen. Mgr., The Continental Eng. & Contr. Co., 305 D. S. Morgan Bldg., Buffalo, N. Y		June 4, 1902
Nelles, George Thomas. U. S. Asst. Engr., 523 Caxton Bldg., Cleveland, Ohio		Oct. 3, 1888
Newell, Frederick Haynes. Chf. Engr., U. S. Reclamation Service, 1330 F St., N. W., Washington, D. C		Dec. 5, 1900

		Date of Membership
Newman, Robert Morris. Jackson, Mich.		May 6, 1874
Nichol, John. 21 Quincy St., Chicago, Ill.	Assoc. M.	Oct. 2, 1872 April 5, 1876
Nichols, Edwin Jay. Res. Engr., Tex. & N. O. R. R. Co., 1508 Hardy St., Houston, Tex.		Sept. 2, 1896
Nichols, Lewis Abel. Cons. Engr., 225 Dearborn St., Room 508, Chicago, Ill		Oct. 5, 1892
Nichols, Othniel Foster. Chf. Engr., Dept. of Bridges, Park Row Bldg., New York City		June 7, 1876
Nichols, Willard Atherton. Redlands, Cal.		May 7, 1873
Nicholson, George Benson. Chf. Engr., C., N. O. & T. P. Ry. Co. and A. G. S. R. R. Co., 530 Garrard St., Covington, Ky.		May 1, 1878
Nicolls, William Jasper. 1018 South 49th St., Philadelphia, Pa.		June 5, 1878
Nicolson, George Llewellyn. Gen. Mgr., C. & O. Canal, Washington, D. C.		Dec. 5, 1894
NOBLE, ALFRED. (*Past-President*). 20 West 34th St., New York City	Jun. M.	Sept. 2, 1874 April 3, 1878
Noble, Theron Augustus. Res. Engr., State of Washington Reclamaton Service, U. S. Geological Survey, 428 Peyton Bldg., Spokane, Wash.		June 2, 1897
Norris, Robert Van Arsdale. Chf. Engr., Coal & Water Cos., P. R. R., Wilkesbarre, Pa.	Jun. M.	Dec. 7, 1887 Mar. 5, 1902
N. North, Edward P. 220 West 57th St., New York City		Dec. 4, 1867
Northrup, Herbert Franklin. Res. Engr., C., C., C. & St. L. Ry., Guilford, Ind.		Jan. 6, 1892
Norton, Albert Gray. Insp., Eng. Dept., B. & O. R. R., 301 Delaware Ave., Washington, D. C.		Dec. 4, 1901
Norton, John Talcott. Cons. Engr., 606 Commercial Pl., New Orleans, La.		Nov. 3, 1897
Nostrand, Peter Elbert. Official Surv., The Lawyers' Title Insurance Co. of New York; Cons. Engr., 37 Liberty St., New York City	Assoc. M. M.	Sept. 7, 1892 Mar. 6, 1895
Noyes, Ellis Bradford. Civ. Engr.'s Office, U. S. Navy Yard, Norfolk, Va.	Jun. M.	July 7, 1880 Oct. 2, 1889
Oakley, Frank Thompson. Civ. and Cons. Engr. (Oakley & Tonson), 1014 The Spitzer, Toledo, Ohio	Assoc. M. M.	Feb. 6, 1895 June 6, 1900
Ockerson, John Augustus. Mem., Mississippi River Comm.; Chf., Dept. Liberal Arts, Louisiana Purchase Exposition, St. Louis, Mo.		July 7, 1880
Odell, Frederick Sylvester. Port Chester, N. Y.		Mar. 5, 1884
O'Donnell, John Patrick. Palace Chambers, Westminster, S. W., London, England		July 5, 1893
O'Hanly, John Lawrence Power. Cons. Engr., Ottawa, Ont., Canada.		Sept. 5, 1883
Olcott, Eben Erskine. Min. Engr., 36 Wall St., New York City		July 5, 1893
Olmsted, Ashbel Edward. Div. Engr., Rapid Transit Subway Constr. Co., 744 St. Nicholas Ave., New York Ctiy		May 6, 1903
Olmsted, Frank Henry. Cons. Engr., 616 Grant Bldg., Los Angeles, Cal.		Feb. 7, 1900

		Date of Membership.
Olney, Alfred Clarence. Asst. Engr., Atlantic Coast Line, Wilmington, N. C.	Jun. M.	April 30, 1895 Nov. 2, 1898
Olney, LaFayette. Civ. Cons. Engr., 99 Nassau St., New York City.		Oct. 7, 1868
Opdyke, Stacy Brown, Jr. Vice-Pres., Levering & Garrigues Co., Dunellen, N. J.		Feb. 2, 1876
Orange, James. (Leigh & Orange), Hong Kong, China		Dec. 3, 1890
O'Rourke, John Francis. Cons. Engr., 26 Nassau St., New York City.		April 2, 1884
Osborn, Frank Chittenden. Pres., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio		Oct. 3, 1888
OSGOOD, JOSEPH OTIS. (*Director*). Chf. Engr., C. R. R. of N. J., Jersey City (Res., Plainfield), N. J.	Jun. M.	May 3, 1876 Mar. 5, 1879
O'Shaughnessy, Michael Maurice. Mill Valley, Marin Co., Cal.		June 4, 1902
Ostrom, John Nelson. Bridge Engr., 1518 Farmers Bank Bldg., Pittsburg, Pa.		Nov. 5, 1890
Ostrup, John Christian. Pres., The Ostrup Eng. Co., 7 Water St., Boston, Mass.	Assoc. M. M.	Mar. 4, 1896 Mar. 1, 1899
Otagawa, Masayuki. 57 Haramachi I'tchome, Ushigomeku, Tokyo, Japan		Jan. 2, 1895
Otis, George Ellison. Div. Engr., Ft. Smith & West. Ry., Mansfield, Ark		July 3, 1895
Owen, James. Cons. Engr., 196 Market St., Newark, N. J.		Sept. 15, 1869
Owens, Henry Kinder. Cons. Civ. Engr., Sullivan Bldg., Seattle, Wash.		Mar. 6, 1889
Oxholm, Theodor Smidt. Prin. Asst. Engr., Office of Pres. of the Borough of Richmond, St. Austins Pl., West New Brighton, N. Y.		Nov. 3, 1897
Packard, Ralph Gooding. (R. H. & J. S. Packard), 130 Pearl St., New York City		Feb. 17, 1869
Paget, Edmund Winter. Room 38, Washington Bldg., Portland, Ore.		June 5, 1901
Paine, Arthur Bickley. Room 220, Bourse Bldg., Philadelphia, Pa.		Sept. 6, 1882
PAINE, CHARLES. (*Past-President*). Cons. Engr., Tenafly, N. J.		Dec. 4, 1867
Palmer, Frederick. Bengal Club, 1 Park St., Calcutta, India		Oct. 4, 1899
Pardee, James Thomas. 242 Clifton Boulevard, Cleveland, Ohio	Assoc. M. M.	June 5, 1895 June 5, 1901
Paret, Milnor Peck. Chf. Engr., Kans. City, Mex. & Orient Ry. Co., 705 Bryant Bldg. (Res., 3516 Baltimore Ave.), Kansas City, Mo.		Sept. 2, 1885
Parker, Andrew McClean. Chf. Engr., Ryan-Parker Constr. Co., 13 Park Row, New York City		Mar. 6, 1889
Parker, Charles Jeremiah. Prin. Asst. Engr., N. Y. C. & H. R. R. R., Grand Central Station, New York City		Feb. 7, 1900
Parker, Harold. Mem., Mass. Highway Comm.; Mem. Wachusett Mt. State Reservation Comm.; (Parker & Bateman), Clinton (Res., So. Lancaster), Mass.		June 7, 1899
Parker, Maurice Stiles. Engr. and Contr., Care, Winston Bros. Co., Lee & Craney, Hoopeston, Ill.		Feb. 5, 1890
Parker, William. Div. Engr., Boston & Albany R. R., N. Y. C. & H. R. R. R. Co., Lessee, Room 372, South Station, Boston, Mass.		Mar. 7, 1900

		Date of Membership.
Parkhurst, Henry Williams. Engr., Bridges and Bldgs., Ill. Cent. System, Chicago, Ill.		Sept. 5, 1877
Parmley, Walter Camp. Concrete and Steel Sewer and Arch. Eng., 1 Madison Ave., New York City (Res., 194 Inwood Ave., Upper Montclair, N. J.)	Assoc. M. M.	April 1, 1896 June 1, 1898
Parsons, Harry de Berkeley. Cons. Engr., 22 William St., New York City, and Prof. of Steam Eng., Rensselaer Polytechnic Inst., Troy, N. Y		Feb. 3, 1897
Parsons, H. C. (Parsons & Melius), Tweddle Bldg., Albany, N. Y.		Oct. 6, 1886
Parsons, William Barclay. Chf. Engr., Rapid Transit Comm., 320 Broadway; Cons. Engr., 22 William St., New York City	Jun. M.	June 7, 1882 Nov. 2, 1887
Paschke, Theodore. 335 Central Park West, New York City		Mar. 7, 1894
Patrick, Mason Mathews. Capt., Corps of Engrs., U. S. A., West Point, N. Y.		Oct. 7, 1903
Patten, Henry Benjamin. 208 West 22d St., Cheyenne, Wyo		Jan. 4, 1888
Patterson, John Curtis. Pres., The Philadelphia Clay Mfg. Co., 706 Drexel Bldg., Philadelphia, Pa		Oct. 2, 1889
Pearl, James Warren. Engr. and Contr., Benton Harbor, Mich		Jan. 2, 1889
Pearson, Fred Stark. Cons. Engr., 29 Broadway, New York City		Nov. 3, 1897
Pearsons, Galen W. Civ. and Mech. Engr., 1611 Baltimore Ave., Kansas City, Mo		Jan. 6, 1875
Peary, Robert Edwin. Civ. Engr., U. S. N., 2014 Twelfth St., N. W., Washington, D. C		Mar. 3, 1886
PEGRAM, GEORGE HERNDON. (*Director*). Chf. Engr., Manhattan Ry. Div., Interborough Rapid Transit Co., 195 Broadway, New York City	Jun. M.	April 7, 1880 Jan. 3, 1883
Pence, William David. Prof. of Civ. Eng., Purdue Univ., Lafayette, Ind		Oct. 4, 1899
Perkins, Charles Penrose. 2005 DeLancey St., Philadelphia, Pa	Jun. M.	Feb. 3, 1875 April 5, 1882
Perkins, Edmund Taylor. Engr., Reclamation Service, U. S. Geological Survey, Yuma, Ariz		Dec. 3, 1902
Perrilliat, Arsène. Mem., Board of State Engrs. of Louisiana, Cotton Exchange Bldg., New Orleans, La.	Assoc. M. M.	June 7, 1893 April 5, 1899
Peterson, Peter Alexander. Cons. Engr., Canadian Pacific Ry., Montreal, Que., Canada		Jan. 5, 1876
Pettigrew, Thomas. 1208 Stevenson Bldg., Indianapolis, Ind.		Oct. 4, 1893
Pew, Arthur. Pres , The South Georgia Eng. Co., Hawkinsville, Ga.		Dec. 2, 1885
Phillips, Arthur Lewis. Asst. Chf. Engr., Chic., St. L., Memphis & N. O. R. R., 536 Randolph Bldg., Memphis, Tenn		Nov. 4, 1903
Phillips, Asa Emory. D. C. Asst. Engr.; Engr. in Chg. preparation of plans and constr. of sewage disposal system, 2d and N Sts., S. E., Washington, D. C.	Jun. Assoc. M. M.	Nov. 5, 1891 Dec. 7, 1898 Sept. 4, 1901
Phillips, Hiram. Cons. Hydr. and San. Engr.; Pres., Board of Public Impvts., St. Louis, Mo	Assoc. M. M.	Jan. 3, 1894 Nov. 3, 1897
Phillips, Joseph Leslie. Director de la Compañia de Inguarán, Apartado postal No. 752, City of Mexico, Mexico		Nov. 3, 1897

		Date of Membership.
Pickett, William Douglas. Four Bear, Big Horn Co., Wyo.		July 6, 1853
Pierce, Henry. Div. Supt., C. & O. Ry., Ronceverte, W. Va.		Dec. 5, 1894
Pierce, William Thomas. Chf. Engr., Met. Park Comm., 14 Beacon St., Boston, Mass.		May 6, 1896
Pierson, George Spencer. Civ., Hydr. and San. Engr., Kalamazoo, Mich.		June 5, 1889
Pihl, Olaf Ridley. 814 Lewis Bldg., Pittsburg, Pa.		Oct. 2, 1889
Plimpton, Arthur Leslie. Civ. Engr. in Chg. of Dept. of Civ. Eng., Bureau of Surface Lines, Bost. Elev. Ry. Co., 101 Milk St., Boston, Mass.		May 6, 1896
Plympton, George Washington. Prof. of Civ. Eng., Brooklyn Polytechnic Inst., Director, Cooper Union (Res., 127 Herkimer St.), Brooklyn, N. Y.		Jan. 29, 1868
Poetsch, Charles Julius. City Engr., and Pres., Board of Public Works, Milwaukee, Wis.	Jun. M.	May 4, 1881 May 2, 1883
Poland, William Babcock. Supt., Indiana Div., B. & O. S. W. R. R., Cincinnati, Ohio	Jun. Assoc. M. M.	Oct. 31, 1893 May 3, 1899 Sept. 2, 1903
Polhemus, James Suydam. U. S. Asst. Engr., U. S. Custom House, Portland, Ore		Oct. 3, 1894
Polledo, Ysidoro. Manzaneda 16, Matanzas, Cuba	Jun. M.	Jan. 2, 1889 Nov. 4, 1903
Porter, Albert Hezekiah. Cons. Engr., Thetford Center, Vt.		Mar. 6, 1889
Porter, Dwight. Prof. of Hydr. Eng., Mass. Inst. Tech., Boston, Mass.		Oct. 4, 1893
Porter, Henry Hobart, Jr. (Sanderson & Porter), 52 William St., New York City		June 3, 1903
Porter, Henry Tegmeyer. Chf. Engr., Pitts., Bessemer & L. E. R. R. and West. Allegheny R. R., Greenville, Pa.		April 1, 1903
Post, George Browne. 33 East 17th St., New York City		Sept. 2, 1896
Post, Henry Willis. Cons. Structural Engr., 281 Fourth Ave., New York City		Oct. 7, 1903
Post, Walter A. Gen. Supt., Newport News Ship-Building & Dry Dock Co., Newport News, Va.		Mar. 1, 1893
Potter, Charles Lewis. Capt., Corps of Engrs., U. S. A., 519 Providence Bldg., Duluth, Minn.		April 1, 1903
Potter, Henry Witbeck. Westinghouse Elec. & Mfg. Co., 11 Pine St., New York City		Dec. 5, 1888
Powell, Ambrose Vincent. Cons. Civ. Engr., 1008 Chamber of Commerce Bldg., Chicago, Ill.		Feb. 6, 1901
Powell, Archibald Olin. Prin. Asst. Engr., U. S. Engr. Office, Bank of Minnesota Bldg., P. O. Box 654, St. Paul, Minn.		Mar. 2, 1898
Powell, Charles Francis. Maj., Corps of Engrs., U. S. A., P. O. Bldg., New London, Conn.		Oct. 3, 1888
Power, George Coffin. Ventura, Ventura Co., Cal.		Feb. 1, 1893
Powers, Joseph Allen. Pres. and Treas., Powers & Mansfield Co., 280 River St., Troy, N. Y.	Jun. M.	April 2, 1884 Sept. 3, 1890
Poynor, David Ashley. Athens, Tex.		June 1, 1892

		Date of Membership.
Pratt, Mason Delano. Engr., Frog and Switch Dept., The Pennsylvania Steel Co., Steelton, Pa.	Jun. Assoc. M. M.	Sept. 5, 1888 Feb. 3, 1897 April 3, 1901
Pratt, William Abbott. Div. Engr., B. & O. R. R., St. George (Res., 3 Davis Ave., West New Brighton), N. Y.		July 5, 1882
Pratt, William Arthur. Asst. to Chf. Engr., P. R. R. Co., Broad St. Station, Philadelphia, Pa.		Dec. 4, 1895
Prevost, Sutherland Mallet. Third Vice-Pres., P. R. R., Philadelphia, Pa.		Jan. 6, 1875
Price, William Gunn. Room 1121, Frick Bldg., Pittsburg, Pa.		April 3, 1895
Prichard, Henry Sewall. Statistician, Am. Bridge Co., Pencoyd, Pa.		Jan. 2, 1895
Prince, Edward. Cons. Engr., Stern Bldg., Quincy, Ill.	Jun. M.	Feb. 6, 1878 Nov. 1, 1882
Prince, George Thomas. Asst. Chf. Engr., The Denver Union Water Co., Denver, Colo.		April 4, 1894
Prindle, Franklin Cogswell. Civ. Engr., U. S. N., Rear-Admiral (*Retired*), The Cairo, Washington, D. C.		Mar. 4, 1874
Prior, Charles Henry. Real Estate, 209 South Fifth St., Minneapolis, Minn.		Mar. 1, 1882
Probasco, Samuel R. 179 Washington St., Brooklyn, N. Y.		Nov. 18, 1868
Prout, Henry Goslee. Vice-Pres. and Gen. Mgr., Union Switch & Signal Co., 143 Liberty St., New York City.	Assoc. M. M.	Nov. 6, 1872 Sept. 3, 1879
Purdon, Charles de la Cherois. Chf. Engr., Frisco System, St. Louis, Mo.		Mar. 3, 1886
Purdy, Corydon Tyler. 78 Fifth Ave., New York City.	Jun. M.	Feb. 2, 1887 Dec. 6, 1893
Putnam, George Rockwell. U. S. Coast and Geodetic Survey, Manila, Philippine Islands	Assoc. M. M.	Feb. 1, 1899 June 3, 1903
R. **Quimby, Henry Hodge.** Asst. Engr., Bureau of Surveys, in Chg. of Bridge Div., 412 City Hall, Philadelphia, Pa.		Sept. 3, 1890
Quinette de Rochemont, *Baron* **Emile Theodore.** Inspecteur Général des Ponts et Chaussées; Directeur des Phares et Balises, 18 Rue de Marignan, Paris, France		Jan. 3, 1894
Quinton, John Henry. Cons. Engr., Reclamation Service, U. S. G. S., 1016 West 8th St., Los Angeles, Cal.		Feb. 7, 1900
Quintus, John Charles. Prin. Asst. U. S. Engr., 540 Federal Bldg., Buffalo, N. Y.		Jan. 2, 1889
Raasloff, Harald de. 18 Burling Slip, New York City.	Jun. M.	Dec. 3, 1884 July 3, 1895
Radenhurst, William Napier. Asst. Engr., Water-Works, Rochester, N. Y.	Jun. M.	July 7, 1875 July 7, 1880
Rafter, George W. 195 Kenwood Ave., Rochester, N. Y.		April 2, 1884
Ramsey, Joseph, Jr. Pres., Wabash R. R., St. Louis, Mo.		May 1, 1889
Randolph, Beverly Strother. Min. Supt., Consolidation Coal Co., Frostburg, Md.		May 2, 1888

MEMBERS R

		Date of Membership.
Randolph, Isham. Chf. Engr., San. Dist. of Chicago, Room 1010, Security Bldg., Chicago, Ill		Feb. 4, 1903
Randolph, Lingan Strother. Prof., Mech. Eng., Va. Polytechnic Inst., Blacksburg, Va		Jan. 2, 1890
Raymond, Charles Walker. Lt.-Col., Corps of Engrs., U. S. A., Army Bldg., New York City		June 1, 1892
Raymond, Charles Ward. Address unknown	Jun. M.	Nov. 7, 1877 April 7, 1886
Raymond, William Galt. Prof. of Geodesy, Road Eng. and Topographical Drawing, Rens. Pol. Inst.; Cons. Civ. Engr., Troy, N. Y.		Oct. 3, 1894
Rea, Samuel. Fourth Vice-Pres., P. R. R. Co., 225 Broad St. Station, Philadelphia, Pa		June 4, 1884
Read, Robert Leland. 32 East 3d St., Cincinnati, Ohio		Sept. 2, 1874
Reed, David Abell. Asst. Chf. Engr., Great Northern Power Co., 313 Providence Bldg., Duluth, Minn		Mar. 4, 1896
Reed, Melville Emerson. Hastings, Minn		Mar. 6, 1901
Reed, William Boardman. Engr., M. of W. and Bldgs., Interurban St. Ry. Co., New York City	Assoc. M. M.	Feb. 6, 1895 May 1, 1901
Reeves, David. Pres., The Phœnix Iron Co.; Pres., Phœnix Bridge Co., 410 Walnut St., Philadelphia, Pa	Jun. M.	April 1, 1874 May 3, 1882
Reichmann, Albert Ferdinand. Res. Engr., Am. Bridge Co., 1326 Monadnock Bldg., Chicago, Ill	Jun. Assoc. M. M.	April 30, 1895 Oct. 5, 1898 Mar. 4, 1903
Renshaw, Alfred Howard. 500 Fifth Ave., New York City		June 1, 1898
Reynders, John Van Wicheren. Supt., Bridge and Const. Dept., Pennsylvania Steel Co. (Res., 115 Pine St.), Harrisburg, Pa	Assoc. M. M.	June 1, 1892 Mar. 3, 1897
Rice, George Staples. Deputy Chf. Engr., Rapid Transit R. R. Commrs., 320 Broadway, New York City		Feb. 1, 1882
Rice, Lewis Frederick. Archt. and Civ. Engr.; Asst. Engr., Am. Telephone & Telegraph Co., 125 Milk St., Boston, Mass		Jan. 2, 1889
Rice, Walter Percival. Civ. and Cons. Engr. (The Walter P. Rice Eng. Co.), 729 Society for Savings, Cleveland, Ohio		Mar. 6, 1889
Rich, Isaac. Asst. Engr., N. Y., N. H. & H. R. R., Room 469, Terminal Station, Boston, Mass		May 6, 1903
Richards, Albert Lennox. U. S. Asst. Engr., Federal Bldg., Rock Island, Ill		Jan. 2, 1901
Richards, Hugh Tudor. Chf. Engr., San Diego East. Ry., Isis Bldg., San Diego, Cal		Oct. 6, 1886
Richards, Joseph Thomas. Chf. Engr., M. of W., P. R. R. Co., Broad St. Station, Philadelphia, Pa		April 4, 1894
Richardson, B. Frank. With Rapid Transit Subway Constr. Co., 184th St. and Broadway, New York City		July 1, 1885
Richardson, Henry Brown. Chf. State Engr., New Orleans, La		May 7, 1879
Richardson, Thomas Franklin. Engr., Dam and Aqueduct Dept., Met. Water-Works, Clinton, Mass		Nov. 4, 1885
Ricker, George Alfred. 702 Ellicott Sq., Buffalo, N. Y.	Jun. Assoc. M. M.	April 7, 1886 May 1, 1895 April 3, 1901

		Date of Membership.
Ricketts, Palmer Chamberlaine. Pres. of, and Prof. of Mechanics, Rensselaer Polytechnic Inst., Troy, N. Y..	Assoc. M.	Feb. 3, 1886 Oct. 5, 1887
Rickon, Frederic John Henry. Quartermaster's Dept., U. S. A., San Francisco, Cal....		Jan. 4, 1888
Ridgway, Robert. Engr., 5th Div., Rapid Transit R. R. Comm., 4 Court Sq., Brooklyn, N. Y....	Jun. M.	Feb. 1, 1888 June 3, 1903
Riffle, Albert Stanley. 312 N. 6th St., Albuquerque, N. Mex.....		May 7, 1890
Riffle, Franklin. Mgr., Iron and Pipe Depts., Dunham, Carrigan & Hayden Co., 17 Beale St., San Francisco, Cal....		Nov. 7, 1888
Riggs, Henry Earle. Civ. and Cons. Engr. (Riggs & Sherman), 613 The Nasby, Toledo, Ohio....	Assoc. M. M.	Oct. 4, 1893 April 1, 1896
Riggs, Morris John. Mgr., Toledo Plant, Am. Bridge Co., Toledo, Ohio....		Dec. 6, 1899
Ripley, Henry Clay. Civ. and Cons. Engr., and Contr. for Constr., Aransas Pass Jetty, Rockport, Tex....		Oct. 7, 1896
Ripley, Joseph. U. S. Asst. Engr., Sault Ste. Marie, Mich....		Sept. 4, 1901
Riser, Knud Sophus. Pres. and Chf. Engr., Grand Rapids Bridge Co., Grand Rapids, Mich....		Feb. 3, 1892
Ritchie, James. (Ritchie & Ruple, Civ. and Cons. Engrs.), Chamber of Commerce Bldg., Cleveland, Ohio....		Nov. 5, 1890
Rix, Edward Austin. Pres., Rix Compressed Air & Drill Co., San Francisco, Cal....		April 7, 1897
Roberts, Evelyn Pierrepont. Civ. and Cons. Engr., 22 William St., New York City....		May 7, 1884
Roberts, Nathaniel. Cons. Engr., Commercial Trust Bldg. (Res., 411 Fairmount Ave.), Jersey City, N. J....	Assoc. M. M.	Nov. 4, 1891 May 2, 1894
Roberts, Percival, Jr. 717 Arcade Bldg., Philadelphia, Pa.	Assoc. M.	May 7, 1879 June 4, 1884
Robinson, Albert Alonzo. Pres., Mex. Cent. Ry. Co., Ltd., 422 Olive St., St. Louis, Mo....		May 5, 1880
Robinson, Albert Fowler. Bridge Engr., A., T. & S. F. Ry. System, 910 Monroe St., Topeka, Kans....		Nov. 2, 1887
Robinson, Arthur Wells. 14 Phillips Sq., Montreal, Que., Canada..		Feb. 3, 1892
Robinson, George Henry. 328 Atlas Blk., Salt Lake City, Utah.....		Mar. 7, 1888
R. Robinson, Stillman Williams. Prof. Emeritus in Mech. Eng., Ohio State Univ. (Res., 1353 Highland St.), Columbus, Ohio....		Jan. 2, 1884
Rockwell, Samuel. Prin. Asst. Engr., L. S. & M. S. Ry., Cleveland, Ohio....		Jan. 7, 1880
Rodd, Thomas. Chf. Engr., Penn. Lines W. of Pitts., Pittsburg, Pa.		June 5, 1878
Rogers, Merritt Harrison. Cons. Engr., 1314 Gilpin St., Denver, Colo....		Jan. 2, 1890
Rogers, Walter Alexander. Vice-Pres., Bates & Rogers Constr. Co., 1205 Manhattan Bldg., Chicago, Ill..	Jun. Assoc. M. M.	Sept. 10, 1891 Nov. 3, 1897 April 4, 1900
Rogge, John Charles Lewis. Pres. and Mgr., Contrs. Supply Co., 198th St. and Webster Ave., New York City....	Jun. M.	Mar. 31, 1891 Oct. 5, 1898
Rohwer, Henry. Chf. Engr., Mo. Pac. Ry. Co., St. L., I. M. & S. Ry. Co. and Leased, Operated and Independent Lines, St. Louis, Mo.		April 1, 1903

		Date of Membership.
Rollins, James Wingate, Jr. Contr. (Holbrook, Cabot & Rollins), 923 Beacon Bldg., Boston, Mass.		Nov. 7, 1900
Rood, Henry Martyn. 163 William St., Port Chester, N. Y.		Dec. 3, 1890
Ropes, Horace. Engr., Weston Aqueduct Dept., Met. Water and Sewerage Board of Mass., South Framingham, Mass.		Sept. 2, 1903
Rose, Charles Clemons. Supt., Coal Dept., The D. & H. Co., Scranton, Pa.		April 4, 1888
Rosencrans, Edwin John. Archt., 31 Union Sq., New York City		May 7, 1902
Rosencrans, William Henry. With Arnold Elec. Power Station Co., Marquette Bldg., Chicago, Ill.		Oct. 5, 1898
Rosewater, Andrew. Cons. Engr.; City Engr. and Pres., Board of Public Works, Omaha, Nebr.		Oct. 3, 1883
Ross, Alexander Bell. Missouri Val. Bridge & Iron Works, Leavenworth, Kans.		May 2, 1900
Ross, Douglas William. Engr., U. S. Geological Survey, Reclamation Service, Boise, Idaho		Mar. 1, 1899
Ross, Florian Gaie. Farmers Bank Bldg., Pittsburg, Pa.		Dec. 2, 1903
Ross, James. Street Railway Chambers, Montreal Que., Canada		Sept. 6, 1882
Rotch, William. Pres., Union Iron & Steel Co., 131 State St., Boston, Mass		Mar. 5, 1873
Roullier, Gustave Anthime. 326 Amity St., Flushing, N. Y		Mar. 1, 1893
R. Rowe, Samuel McMath. Cons. Engr, 364 Monadnock Bldg., Chicago, Ill.		Sept. 2, 1885
Rowland, Charles Bradley. The Continental Iron Works, Brooklyn, N. Y.		May 1, 1895
Rowland, Charles Leonard. Proprietor, Morton Iron Works, 102 Greene St., Brooklyn, N. Y.		Sept. 1, 1886
Rowland, Thomas Fitch. Pres., The Continental Iron Works, Brooklyn, N. Y. (Res., 329 Madison Ave., New York City)	M. Hon. M.	Dec. 4, 1867 Dec. 20, 1899
Rowland, Thomas Fitch, Jr. Secy. and Treas., The Continental Iron Works, Brooklyn, N. Y.		Sept. 1, 1886
Ruddle, John. Gen. Superv. of Canals, The Lehigh Coal & Nav. Co., Mauch Chunk, Pa.		Oct. 3, 1894
Ruggles, William Burroughs. Address unknown		April 7, 1886
Rundlett, Leonard W. 73 City Court House, St. Paul, Minn.		Sept. 5, 1883
Ruple, Commodore Perry. (Ritchie & Ruple, Civ. and Cons. Engrs.), (Secy. and Treas., The C. H. Fath & Son Constr. Co.), Chamber of Commerce Bldg., Cleveland, Ohio		Mar. 5, 1902
Russell, Silas Bent. Cons. Civ. Engr., 417 Pine St., St. Louis, Mo.	Jun. M.	June 4, 1884 June 1, 1887
Rust, Charles Henry. City Engr., Toronto, Ont., Canada		April 5, 1899
Rust, Henry Bedinger. Mgr., The Rust Boiler Co., 605 German National Bank Bldg., Pittsburg (Res., 724 Wallace Ave., Wilkinsburg), Pa.	Assoc. M. M.	April 6, 1898 April 1, 1903
Ruttan, Henry Norlande. City Engr., Winnipeg, Man., Canada		Jan. 4, 1893
Sabin, Alpheus Timothy. Engr. for MacArthur Bros. Co., 810 Fisher Bldg., Chicago, Ill.		April 1, 1896

		Date of Membership.
Sabin, Louis Carlton. Asst. Engr., Engr. Dept., U. S. A., Sault Ste. Marie, Mich.	Assoc. M. M.	Oct. 4, 1893 May 7, 1902
Sackett, John Warren. U. S. Asst. Engr., U. S. Engr. Office, Jacksonville, Fla.		May 2, 1894
Safford, Arthur Truman. Asst. Engr., The Proprietors of Locks and Canals, 66 Broadway, Lowell, Mass.		Sept. 6, 1899
Safford, Edward Stanley. Chf. Engr. and Asst. Mgr., Pittsburgh, San José Reduction & R. R. Co. (Care, Robinson House), Chihuahua, Mexico.		Dec. 6, 1882
Safford, Vinton Putnam. Mgr., Mex. North. Ry., Escalon, Chihuahua, Mexico.		July 4, 1894
Sample, John Henderson. Asst. Engr., Penn. Co., Granville, Licking Co., Ohio.		Oct. 6, 1886
Sanborn, Frank Berry. Prof. of Civ. Eng., Tufts Coll., Mass.		Oct. 1, 1902
Sanderson, James Gardner. 1530 Sanderson Ave., Scranton, Pa.		July 6, 1881
Sarle, Oliver Perry. 146 Westminster St., Providence, R. I.		Jan. 2, 1901
Saunders, William Lawrence. Vice-Pres., The Ingersoll-Sergeant Drill Co.; Editor and Publisher, *Compressed Air*, 26 Cortlandt St., New York City.		Nov. 3, 1886
Savage, Hiram Newton. Engr. in Chg., Sweetwater Dam and Sweetwater Water System, National City, Cal.	Assoc. M. M.	Mar. 7, 1894 Oct. 7, 1896
Saville, Caleb Mills. Div. Engr., Distrib. Dept., Met. Water Board, 1 Ashburton Pl., Boston, Mass.	Assoc. M. M.	Nov. 6, 1895 Jan. 2, 1901
Sawyer, Edward. 60 Congress St., Boston (Res., Newton), Mass.		Oct. 2, 1895
Sax, Percival Mosley. Engr. and Contr., 1328 Chestnut St., Philadelphia, Pa.	Jun. Assoc. M. M.	Jan. 31, 1893 Jan. 3, 1900 April 3, 1901
Scaife, William Lucien. Chairman, Scaife Foundry & Machine Co., Ltd., 28th St., Pittsburg, Pa.		Dec. 3, 1890
Schall, Frederick Edward. Bridge Engr., L. V. R. R., South Bethlehem, Pa.		Oct. 1, 1902
Schaub, Julius William. Cons. Engr., 1650 Monadnock Blk., Chicago, Ill.	Jun. M.	Nov. 5, 1884 Oct. 6, 1886
Schermerhorn, Louis Younglove. Pres., Am. Dredging Co., 510 Mariner and Merchant Bldg., Philadelphia, Pa.		May 5, 1897
Scherzer, Albert John. Santa Ana, Salvador.		Jan. 6, 1886
Schmidt, Max Eberhardt. 45 Broadway, New York City.		May 7, 1879
R. Schneider, Charles Conrad. Cons. Engr., 100 Broadway, New York City.		Feb. 6, 1884
Schofield, Hiram Abif. Dist. Mgr., Pittsburg Testing Laboratory, Ltd., Room 906, Crozer Bldg., Philadelphia, Pa.		Oct. 7, 1896
Schultz, Albert Louis. 817 North Highland Ave., Pittsburg, Pa.		Sept. 4, 1901
Schultze, Paul Louis. City Engr., Utica, N. Y.	Assoc. M. M.	Nov. 2, 1898 June 5, 1901
R. SCHUYLER, JAMES DIX. (*Vice-President*). Cons. Hydr. Engr., 401 Douglas Blk., Los Angeles, Cal.		Dec. 6, 1882
Scott, Addison Moffat. Charleston-Kanawha, W. Va.		June 2, 1886
Scott, Ernest Kay. Care, Hoover & Mason, 1425 Old Colony Bldg., Chicago, Ill.		Mar. 2, 1898

			Date of Membership.
	Scovill, Edward Tracy. Dansville, N. Y.		Sept. 6, 1876
	Scripture, Arthur Marquis. New Hartford, N. Y.	Assoc. M. M.	June 3, 1896 Jan. 5, 1904
	Seaman, Henry Bowman. Cons. Engr., 40 Wall St., New York City	Jun. M.	June 2, 1886 Dec. 7, 1887
	Searles, William Henry. Cons. Civ. Engr., Elyria, Ohio		July 2, 1873
	Sears, Alfred Francis. Portland, Ore		June 2, 1869
	Seaver, John Wright. Vice-Pres., The Wellman-Seaver-Morgan Co., New England Bldg., Cleveland, Ohio		Nov. 6, 1901
N.	Seddon, James Alexander. 906 Security Bldg., Chicago, Ill		Nov. 2, 1898
	Sellers, Coleman. 1301 Stephen Girard Bldg., Philadelphia, Pa.		May 3, 1876
	Sengoku, Mitsugu. The Kiushiu Ry., Moji, Kiushiu, Japan.		June 4, 1890
	Sergeant, George, Jr. Prin. Asst. Engr., Atlantic Ave. Impvt., Long Island R. R., 5 Hanson Pl., Brooklyn, N. Y		April 2, 1902
	Serjeant, Hugh. Care, Western Australian Ry. Dept., Office of Chf. Engr., Perth, Western Australia		Dec. 4, 1901
	Seymour, Horatio. Utica, N. Y.	Assoc. M.	Jan. 8, 1873 April 7, 1880
	Shailer, Robert Ames. Pres., Boston Tunnel Constr. Co., 23 Lewis St., East Boston, Mass		Mar. 3, 1880
	Shankland, Edward Clapp. (E. C. & R. M. Shankland, Civ. Engrs.), 1106 Rookery, Chicago, Ill		Feb. 5, 1890
	Shankland, Ralph Martin. 1106 Rookery Bldg., Chicago, Ill.		Mar. 1, 1899
	Shanly, James Moore. Contr. Engr., 346 Prince Arthur St., Montreal, Que., Canada.		July 6, 1887
	Shaw, Granville Wheaton. U. S. Asst. Engr., P. O. Box 496, Louisville, Ky.		Oct. 5, 1887
	Shaw, Sumner Farnham. 488 Market St., Portland, Ore.		Oct. 3, 1894
	Shearwood, Frederick Perry. Dominion Bridge Co , Montreal, Que., Canada.		Oct. 7, 1903
	Shedd, Edward Whitten. Civ. and Hydr. Engr., Providence, R. I.		May 6, 1903
	Shedd, Joel Herbert. Cons. Engr., Providence, R. I.		Sept. 15, 1869
	Shenehon, Francis Clinton. U. S. Asst. Engr., 33 Campau Bldg., Detroit, Mich		May 7, 1902
	Shepard, David Chauncey. St. Paul, Minn.		May 2, 1883
	Sherman, Charles Winslow. Div. Engr., Met. Water-Works, 1 Ashburton Pl., Boston, Mass.	Jun. Assoc. M. M.	Oct. 8, 1891 May 2, 1900 Feb. 4, 1903
	Sherman, Herbert Ellwood. Asst. Engr. in Chg. of Dept. of Street Lines, City Engr.'s Office, Providence, R. I.		May 7, 1900
	Sherman, Richard Willette. Pres., Troy Public Works Co., City Bank Bldg., Utica, N. Y.		Oct. 6, 1886
	Sherrerd, Morris Robeson. Engr. and Supt., Dept. of Water, Newark, N. J.	Assoc. M. M.	May 3, 1893 May 6, 1896
	Shiraishi, Naoji. 71 Miyamura-cho, Azabu, Tokyo, Japan.		Oct. 4, 1899
	Shirreffs, Reuben. Hydr. Engr., Great Falls Power Co., Washington, D. C.		June 4, 1890
	Shmeleff, Theodor Semenovitch. Engr., Russian Imperial Civ. Service, Novorossüsk (Caucasus), Russia		Sept. 7, 1892

		Date of Membership.
Sibert, William Luther. Capt., Corps of Engrs., U. S. A., P. O. Box 1240, Pittsburg, Pa.		June 2, 1897
Simpson, George Frederic. Asst. Engr., Rapid Transit R. R. Comm., 189 West 136th St., New York City		Mar. 2, 1887
Simpson, George Hume. 6723 McPherson St., Pittsburg, Pa.		Oct. 6, 1880
Sims, Alfred Varley. Prof. of Civ. Eng., Univ. of Iowa, Iowa City, Iowa		Mar. 4, 1896
Sims, Clifford Stanley. Gen. Mgr., B. & O. R. R., B. & O. Central Bldg., Baltimore, Md		April 1, 1903
Simson, David. Gen. Mgr., Buenos Aires West. Ry., P. O. Box 741, Buenos Aires, Argentine Republic		Jan. 8, 1902
Sinclair, Frank Oscar. Burlington, Vt.		Nov. 6, 1901
Sirrine, Joseph Emory. Box 98, Greenville, S. C.	Jun. Assoc. M. M.	June 20, 1893 May 4, 1898 May 6, 1903
Sjöström, Ivar Ludwig. Treas., The Lawrence Dye Works Co., Lawrence, Mass.	Jun. M.	Sept. 6, 1892 Sept. 1, 1897
Skilton, George Steele. Asst. Engr., Dept. of Water Supply, Gas and Electricity of City of New York, Borough of Brooklyn (Res., Rockville Centre), N. Y.		Sept. 7, 1881
Skinner, Frank Woodward. Associate Editor, *The Engineering Record,* 114 Liberty St., New York City		Sept. 1, 1886
Slataper, Felician. Via S. Vito 20, Trieste, Austria		Sept. 15, 1869
Sleeper, George Edward. P. O. Box 3198, Boston, Mass.		Feb. 3, 1904
Sloan, David. 6320 Woodlawn Ave., Chicago, Ill.		Jan. 1, 1896
Slocum, Charles Mills. City Engr., 43 W. Bridge St., Springfield, Mass.		May 5, 1897
Smith, Albert Mather. Engr. of Distrib., Consolidated Gas Co. of N. Y., 4 Irving Pl., New York City		May 5, 1886
Smith, Augustus. Engr. and Contr., 39 Cortlandt St., New York City		June 4, 1902
Smith, Charles William. Chf. Engr., O'Rourke Eng. Constr. Co., 26 Nassau St., New York City	Assoc. M. M.	April 5, 1893 Dec. 1, 1903
Smith, Edwin Foster. Cons. Hydr. Engr., 4102 Locust St., Philadelphia, Pa.		June 5, 1895
Smith, Eugene Raymond. Islip, Suffolk Co., N. Y.	Jun. M.	May 2, 1888 May 1, 1901
Smith, Henry Clement. Div. Engr., Phila. Div., P. & R. Ry., Philadelphia, Pa.		Oct. 2, 1901
Smith, Henry DeWitt. Marshall, Tex.		Dec. 6, 1893
Smith, Jonas Waldo. Chf. Engr., The Aqueduct Commrs., 280 Broadway, New York City	Assoc. M. M.	Oct. 5, 1892 April 5, 1899
Smith, Joseph Shuter. Care, Robt. S. Perry, 5104 Pulaski Ave., Germantown, Philadelphia, Pa.		April 1, 1874
Smith, Leonard Charles Lindsay. Engr. in Chg. of Water Supply, Borough of Queens, 59 Woolsey St., Long Island City, N. Y.		Mar. 6, 1901
Smith, Miller Armstrong. Cons. Engr., 58 Cuba St., Havana, Cuba		Oct. 6, 1886

		Date of Membership.
Smith, Oberlin. Pres., Ferracute Machine Co., "Lochwold," Bridgeton, N. J.		Sept. 3, 1884
Smith, T. Guilford. Mgr. of Sales, Carnegie Steel Co., Pittsburg, U. S. Steel Products Export Co., N. Y., Ill. Steel Co., Chicago, 9 German Ins. Bldg., Buffalo, N. Y.		Sept. 6, 1871
Smith, William Charles. With Richards-Lundeen Co., Gen. Contrs., Minneapolis, Minn.		Sept. 4, 1901
Smith, William Sooy. Monadnock Blk., Chicago, Ill.		Jan. 17, 1872
Smoot, Edgar Kenneth. Concessionario de las obras del Puerto de Manzanillo, Mexico, 40 Montgomery St., San Francisco, Cal.		Feb. 2, 1898
Snook, Thomas Edward. 261 Broadway, New York City.		Mar. 3, 1897
Snow, Charles Henry. Dean, School of Applied Science, New York Univ., New York City	Assoc. M. M.	Feb. 1, 1893 Sept. 2, 1896
Snow, Jonathan Parker. Bridge Engr., B. & M. R. R., Boston, Mass.		June 3, 1885
Snow, William Pliny. Engr. in Chg. of Constr., for Lockwood, Greene & Co. of Boston, Auburndale, Mass.		Feb. 5, 1902
Snyder, Christopher Henry. Contr. Mgr., San Francisco Office of Milliken Bros., New York, 413 Rialto Bldg., San Francisco, Cal.		Oct. 2, 1901
Snyder, George Duncan. Care, Jacobs & Davies, 128 Broadway, New York City.	Assoc. M. M.	Nov. 6, 1895 Sept. 4, 1901
Somerville, Robert. Asst. Chf. Engr., Board of Mississippi Levee Commrs., Greenville, Miss.		June 1, 1887
Sonne, Otto. (P. O. Box 3051), 68 Devonshire St., Boston, Mass.		Sept. 7, 1887
Sooysmith, Charles. Cons. Engr., 71 Broadway, New York City.		May 5, 1886
Sorzano, Julio Federico. Cons. Engr., 228 Garfield Pl., Brooklyn, N. Y.		Sept. 3, 1884
Souder, Harrison. 4435 Sansom St., Philadelphia, Pa.		Jan. 6, 1904
Soule, Howard. Cons. Engr., Syracuse, N. Y.		Mar. 17, 1869
Spalding, Frederick Putnam. Prof. of Civ. Eng., Univ. of Missouri, 807 Virginia Ave., Columbia, Mo.		Dec. 2, 1891
Spencer, Samuel. 80 Broadway, New York City.		Sept. 2, 1885
Sperry, Henry Muhlenberg. Signal Engr. and Agt., The Union Switch & Signal Co., 143 Liberty St., New York City.		Nov. 6, 1901
Spicer, Vibé Kierulff. Signal Engr. and Agt., W. D., The Union Switch & Signal Co., Monadnock Blk., Chicago, Ill.		June 5, 1895
Spilsbury, Edmund Gybbon. Cons. Engr., 216 West State St., Trenton, N. J		Dec. 7, 1892
Spooner, Allen Newhall. Dept., Docks and Ferries, Foot 24th St., East River (Res., 212 East 12th St.), New York City.		Dec. 5, 1900
Spring, Francis Joseph Edward. Mem., Madras Legislative Council; Secy. to Govt. Ry. Dept.; Cons. Engr. to Govt.; Madras Club, Madras, India.		Jan. 3, 1894
Staats, John Henry. Vice-Pres. and Treas., R. P. & J. H. Staats, Engrs. and Contrs., 29 Broadway, New York City.		Mar. 5, 1884
Staats, Robert Parker. (R. P. & J. H. Staats, Civ. Engrs. and Contrs.), 29 Broadway, New York City.	Jun. M.	Nov. 3, 1875 July 1, 1885

		Date of Membership.
Stacpoole, Stephen Westropp. Cons. Engr., 3a Avenida de la Libertad No. 5, Orizaba, Vera Cruz, Mexico..	Assoc. M. M.	May 6, 1896 Sept. 4, 1901
Staley, Cady. Care, Case School of Applied Science, Cleveland, Ohio.		Mar. 17, 1869
Stanford, Homer Reed. Civ. Engr., U. S. N., Navy Yard, Pensacola, Fla..............................	Jun. Assoc. M. M.	Oct. 1, 1890 Nov. 7, 1894 Sept. 4, 1901
Staniford, Charles Wilkinson. 30 Berkeley Pl., Brooklyn, N. Y....		May 7, 1890
Stanton, Frank McMillan. Agt., Atlantic Min. Co., Atlantic Mine, Mich..		Feb. 1, 1899
Stanton, Robert Brewster. Civ. and Min. Engr., 66 Broadway, New York City..		Sept. 1, 1880
Starrett, Milton Gerry. Chf. Engr., Met. St. Ry. Co., 621 Broadway (Res., 349 West 85th St.), New York City.................		Jan. 3, 1900
Stauffer, David McNeely. Vice-Pres., Eng. News Pub. Co., St. Paul Bldg., New York City..		Sept. 2, 1874
N. **Stearns, Frederic Pike.** Chf. Engr., Met. Water and Sewerage Board, 1 Ashburton Pl., Boston, Mass..........................		Oct. 2, 1878
Stearns, Irving Ariel. Pres., Coxe Bros. & Co. (Inc.); Pres., Del., Susq. & Schuylkill R. R. Co., 143 Liberty St., New York City (Res., Wilkesbarre, Pa.)...		April 2, 1884
Steele, Henry Maynadier. Chf. Engr., Cent. of Ga. Ry. Co., Savannah, Ga..............................	Assoc. M. M.	April 5, 1893 Dec. 6, 1899
Stephens, Clinton F. Riverside, Mo....................................		Sept. 5, 1877
Stern, Eugene Washington. Cons. Engr., 1133 Broadway, New York City..		Mar. 3, 1897
Stevens, Frank Stoddard. Supt., Reading Div., P. & R. Ry., Reading, Pa		Oct. 3, 1883
Stevens, Horace Edward. Director, Winston Bros. & Co., Contrs., Minneapolis, Minn..........................	Jun. M.	Nov. 1, 1876 April 4, 1888
Stevens, John Frank. Chf. Engr., C., R. I. & P. Ry., Chicago, Ill...		June 6, 1888
Stewart, John Muirhead. Asst. Engr., Dept. of Docks and Ferries, East 24th St. Office, New York City............	Jun. M.	Mar. 2, 1887 Jan. 4, 1888
Stillwell, Lewis Buckley. Cons. Elec. Engr., Park Row Bldg., New York City..		Oct. 2, 1901
Stites, Archer Cochran. With Joseph T. Ryerson & Son, 18 Milwaukee Ave., Chicago, Ill..............	Jun. Assoc. M. M.	Dec. 3, 1890 Nov. 4, 1891 May 6, 1896
Stoddard, George Caleb. Civ. and San. Engr., 215 West 125th St., New York City.......................................		April 4, 1900
N. **Stone, Edward Herbert.** Freshford, Somerset, England........ ...		Dec. 5, 1888
Storey, William Benson, Jr. Chf. Engr., San Fran. & N. W. Ry., Crossley Bldg., San Francisco, Cal.........................		Jan. 2, 1889
Stowell, Charles Frederick. (Stowell & Cunningham), 51 State St., Albany, N. Y.........		April 4, 1888
Strachan, Joseph. Asst. Engr., Bureau of Highways, 352 Putnam Ave., Brooklyn, N. Y.................	Assoc. M. M.	May 4, 1892 May 4, 1898
Strobel, Charles Louis. Cons. and Contr. Engr., 1744 Monadnock Blk., Chicago, Ill..		Dec. 3, 1879

	Date of Membership.
STRONG, MASON ROMEYN. Bridge Engr., Erie R. R. Co., C. & E. R. R. Co., N. Y., S. & W. R. R. Co., 237 Lexington Ave., Passaic, N. J.	Mar. 6, 1901
STUART, ALFRED ALLEN. Mgr. for M. P. Davis, Constr. of Wheel Pit, Niagara Falls, Ont., Canada...	Oct. 7, 1891
STUART, FRANCIS LEE. Dist. Engr., B. & O. R. R., 6 Park St., Cumberland, Md..	May 3, 1899
STUBBS, LINTON WADDELL. Asst. Engr., S. P. R. R., Lake Charles, La.	Oct. 3, 1888
STURTEVANT, CARLETON WILLIAM. Engr. with The Atlantic, Gulf & Pacific Co., Scranton, Miss...	Oct. 2, 1901
SUBLETTE, GEORGE WASHINGTON. 2616 First Ave., South, Minneapolis, Minn ...	Oct. 1, 1902
SULLIVAN, JOHN G. Div. Engr., Constr. Dept., C. P. Ry., Bank of Hamilton Chambers, Winnipeg, Man., Canada.	Sept. 6, 1899
SUMNER, HORACE AUGUSTUS. Chf. Engr., Denver, N. W. & Pac. Ry. Co., Room 717, Majestic Bldg., Denver, Colo.	Oct. 4, 1899
SUNDSTROM, CARL ALFRED. Surv. and Regulator, 8th Survey Dist., Dept. of Public Works, Philadelphia; Office, 4444 Main St., Manayunk, Philadelphia, Pa.	Oct. 3, 1894
SUPPLEE, JESSE. 646 West 9th St., Erie, Pa.	June 3, 1903
SUTER, CHARLES RUSSELL. Col., Corps of Engrs., U. S. A., Army Bldg., 39 Whitehall St., New York City	April 1, 1896
SUTERMEISTER, ARNOLD HENRY. Engr. for Railroad Commrs., 306 Washington Ave., Albany, N. Y	June 3, 1902
SWAIN, GEORGE FILLMORE. Prof. of Civ. Eng., Mass. Inst. Tech.; Engr., Mass. R. R. Comm.; Mem., Boston Transit Comm.; Mass. Inst. Tech., Boston, Mass.....	Assoc. Sept. 5, 1883 M. Mar. 2, 1892
SWENSSON, EMIL. Cons. and Constr. Engr., 925 Frick Bldg., Pittsburg, Pa.	June 7, 1893
SWINBURNE, GEORGE WAY. Civ. and San. Engr. (Swinburne & Clark), 156 Fifth Ave., New York City	May 7, 1902
SYMONS, THOMAS WILLIAM. Col., Corps of Engrs., U. S. A., Office of Public Bldgs. and Grounds, Lemon Bldg., Washington, D. C.	Oct. 3, 1894
TALBOT, ARTHUR NEWELL. Prof. of Municipal and San. Eng., Univ. of Illinois, Urbana, Ill.	April 4, 1888
TALBOTT, HARRY ELSTNER. Civ. Engr. and Gen. Contr., Dayton, Ohio.	June 6, 1900
TATNALL, GEORGE. Civ. and Cons. Engr., 1411 Harrison St., Wilmington, Del.	May 3, 1899
TAUSSIG, HUBERT PRIMM. Cons. Civ. Engr., 1211 Chemical Bldg., St. Louis, Mo.	Oct. 3, 1894
TAYLOR, EDWARD BALLINGER. Fourth Vice-Pres., Penn. Co. and Pitts., Cin., Chic. & St. L. Ry. Co., Room 901, Union Station, Pittsburg, Pa.	Sept. 3, 1884
TAYLOR, HARRY. Capt., Corps of Engrs., U. S. A., Company L, Battalion of Engrs., Manila, Philippine Islands.	Oct. 7, 1896
TAYLOR, JAMES TOWNSEND. Cons. Hydr. Engr., Honolulu, Hawaii....	Jan. 3, 1894
TAYLOR, LUCIAN ARNOLD. Cons. Engr., 719 Tremont Bldg., Boston, Mass.	Nov. 4, 1891

Member	Grade	Date of Membership.
Taylor, Norton Longstreth. 801 No. I St., Tacoma, Wash		Feb. 4, 1891
Taylor, Samuel Alfred. Cons. Civ. and Min. Engr., 900 Lewis Blk., Pittsburg, Pa		Oct. 7, 1903
Taylor, Thomas Ulvan. Prof. of Civ. Eng., Univ. of Texas, Austin, Tex	Assoc. Assoc. M. M.	Jan. 31, 1893 Oct. 2, 1895 Oct. 2, 1901
Taylor, William Dana. Prof., Railway Eng., Univ. of Wisconsin, 415 Wis. Ave., Madison, Wis		Mar. 1, 1899
Tays, Eugene Augustus Hoffman. Mgr., "Maconi-Doctor," Mines and Smelters, Maconi, Districto de Cadereyta, Queretaro, Mexico.		April 6, 1898
Teilman, Ingvart. City Engr., Fresno, Cal		June 3, 1903
Temple, John Charles. Cor. Walnut Lane and Green St., Germantown, Philadelphia, Pa		May 4, 1898
Temple, William Henry Giles. Civ. and Hydr Engr., 75 Westminster St., Providence, R. I.		Feb. 3, 1892
Terry, Edward Clinton. Hartford, Conn		Feb. 6, 1895
Thacher, Edwin. Cons. Engr. and Mem., Concrete-Steel Eng. Co., Park Row Bldg., New York City		Feb. 17, 1869
Thackray, George Edward. Structural Engr., Cambria Steel Co., Johnstown, Pa	Jun. M.	Sept. 6, 1882 April 7, 1886
Thayer, Russell. United Gas Impvt. Co., Broad and Arch Sts., Philadelphia, Pa		Dec. 6, 1882
N. Thomas, Benjamin Franklin. U. S. Asst. Engr., Louisa, Ky		April 6, 1887
Thomas, George Edward. Superv. Engr., I. B. R. T., 59th St. Power House, New York City		Oct. 5, 1898
Thompson, Benjamin. 346 McCalla Ave., Chattanooga, Tenn		July 3, 1889
Thompson, Ellis Dunn. Prin. Asst. Engr., U. S. Engr. Office, Philadelphia, Pa		Feb. 1, 1899
Thompson, Fred. Civ. Engr., U. S. N., Navy Yard, Norfolk, Va		Oct. 1, 1902
Thompson, Gaylord. Gen. Mgr., Beaver Val. Traction Co., Box 643, Beaver, Pa		April 2, 1890
Thompson, Henry Clark. 42 Lorillard Pl., Fordham, New York City		Feb. 4, 1903
Thompson, Samuel Clarence. Engr. of Highways, Municipal Bldg., Bronx (Res., 950 East 166th St.), New York City		Feb. 6, 1889
Thompson, William Andrew. U. S. Asst. Engr., La Crosse, Wis		Oct. 7, 1896
Thomson, George Huntington. Civ. and Cons. Engr., Care, The Transportation Club, 42d St. and Madison Ave., New York City.		Feb. 2, 1887
Thomson, John. 253 Broadway, New York City		Mar. 2, 1887
Thomson, Reginald Heber. City Engr., 701 Yesler Way, Seattle, Wash		Dec. 2, 1903
Thomson, Thomas Kennard. Cons. Engr., Park Row Bldg., New York City	Jun. Assoc. M. M.	Oct. 3, 1888 June 3, 1891 Dec. 4, 1895
Thornhill, Edward Baylies. Chf. Engr., L. & N. W. Ry., Euston Station, London, England		Oct. 7, 1903
Tibbals, George Attwater. The Continental Iron Works, Brooklyn, N. Y	Jun. M.	May 2, 1888 Mar. 4, 1896

		Date of Membership.
Tibbals, Samuel Gaylord. The Continental Iron Works, Brooklyn, N. Y.	Jun. M.	May 2, 1888 May 5, 1897
Till, Joseph. Freeburgh, Houston Co., Minn.		Oct. 4, 1899
Tillson, George William. Chf. Engr., Bureau of Highways, Room 12, Municipal Bldg., Brooklyn, N. Y.		Oct. 7, 1896
Timonoff, Vsevolod Evguenievitch. Prof. of the Inst. of Ways of Communications; Director of Ways and Communications of the Div. of St. Petersburg, Perspective Zabalkanski 9, St. Petersburg, Russia.		May 3, 1893
Tingley, George Curtis. 75 Westminster St., Providence, R. I.		Sept. 6, 1871
Tingley, Richard Hoadley. Pres. and Chf. Engr., The R. H. Tingley Co., Cons. Engrs., 29 Broadway, New York City (also 75 Westminster St., Providence, R. I.)		April 3, 1901
Tinkham, Samuel Everett. Asst. Engr., Eng. Dept., City Hall, Boston, Mass.		Mar. 2, 1892
Tintorer y Giberga, Joseph. Claris 32, Barcelona, Spain		May 5, 1880
Tittmann, Otto Hilgard. Supt., U. S. Coast & Geodetic Survey, Washington, D. C.		June 4, 1902
Todd, Frank Herbert. Cons. Engr. (Sturtevant & Todd), 1208 Fisher Bldg., Chicago, Ill.		Feb. 6, 1889
Tollinger, Edward Chandler. U. S. Asst. Engr., Greenville, Miss.		June 4, 1902
Tomlinson, Alfred Thomas. Engr. and Supt., J. G. White & Co., 29 Broadway, New York City		Sept. 7, 1887
Tomlinson, Sam. 1 Raffles Pl., Singapore, Straits Settlements.		April 6, 1892
Tompson, George Morris. Civ. and Cons. Engr., 6 Beacon St., Room 602, Boston, Mass.		May 2, 1888
Tone, Sumner La Rue. Second Vice-Pres., Pittsburg Rys. Co., 5607 Howe St., Pittsburg, Pa.		Dec. 4, 1901
Tönnesen, Tobias. Kontroll-Ingenieur Otavi Minen- und Eisenbahn-Gesellschaft, Swakopmund, German S. W. Africa.		May 1, 1901
Touceda, Enrique Augusto. 51 State St., Albany, N. Y.		Jan. 3, 1900
Towl, Forrest Milton. Gen. Supt., National Transit Co., 26 Broadway, New York City (Res., 794 Carroll St., Brooklyn, N. Y.)		Feb. 5, 1896
Towle, Stevenson. Civ. and Cons. Engr., 7 East 42d St., New York City		Feb. 19, 1868
Townsend, Curtis McDonald. Maj., Corps of Engrs., U. S. A., Manila, Philippine Islands.		Nov. 1, 1893
Trask, Frank Ellsworth. Cons. Civ. and Hydr. Engr., 405 Douglas Bldg., Los Angeles, Cal.	Assoc. M. M.	June 5, 1895 Jan. 2, 1901
Treadwell, Lee. U. S. Navy Yard, Portsmouth, N. H.	Jun. Assoc. M. M.	Nov. 5, 1890 Oct. 4, 1893 Dec. 2, 1896
Tribus, Louis Lincoln. Cons., Civ. and Hydr. Engr. (Tribus & Massa), 84 Warren St., New York City; also Commr. of Public Works, Borough of Richmond, City of New York	Jun. Assoc. M. M.	April 4, 1888 June 1, 1892 April 1, 1896
Trocon, Albert Alexander. (The Midland Bridge Co., Freygang & Trocon, Proprs.), Kansas City, Mo.		May 1, 1895

		Date of Membership.
Trotter, Alfred Williams. 141 Broadway, New York City...	Jun. M.	Sept. 5, 1883 Nov. 7, 1894
Trundle, Horatio Hartley. Civ. Engr. and Contr., Leesburg, Va.	Assoc. M. M.	June 7, 1899 Mar. 6, 1901
Tubbs, Joseph Nelson. Gen. Insp., State Dept. of Public Works, 207 Wilder Bldg., Rochester, N. Y.		Sept. 3, 1884
Tucker, Lester Waldo. 34 Banks St., West Somerville, Mass.		Dec. 4, 1901
Tucker, Ross Francis. Pres., Tucker & Vinton, Inc., 156 Fifth Ave., New York City		Oct. 7, 1903
Tuckey, Thomas William Townsend. Dist. Engr., Imperial Rys. of North China, Tientsin, North China		June 3, 1903
Tullock, Alonzo J. Engr. and Contr., Prop., Missouri Val. Bridge & Iron Works, Leavenworth, Kans.		June 6, 1883
Turner, Claude Allen Porter. Cons. Engr. and Archt., 816 Phœnix Bldg., Minneapolis, Minn.		Mar. 6, 1901
Turner, Edmund Kimball. 53 State St., Boston, Mass.		Nov. 4, 1891
Turner, Nathaniel. 53 B. Calle de Ocampo, Monterey, N. L., Mexico.		Mar. 6, 1895
Tuska, Gustave Robitscher. Cons. Engr., 62 William St., New York City	Jun. Assoc. M. M.	Mar. 6, 1894 Jan. 1, 1896 Nov. 2, 1900
Tutein-Nolthenius, Rudolph Peter Johann. Heerengracht No. 132, Amsterdam, The Netherlands		Dec. 6, 1899
Tuthill, Job. Bridge Engr., Pere Marquette R. R., Detroit, Mich.	Jun. M.	June 6, 1888 Oct. 4, 1893
Tuttle, Arthur Smith. Prin. Asst. Engr., Board of Estimate and Apportionment, City Hall, New York City	Jun. Assoc. M. M.	Mar. 2, 1887 May 2, 1894 Mar. 2, 1898
Tutton, Charles Harold. Asst. Engr., Dept. Public Works, Room 13, City Hall, Buffalo, N. Y.		Oct. 2, 1901
Tutwiler, Thomas Henry. Engr. in Chg. of Constr., Nashville Ry. & Light Co., for Ford, Bacon & Davis, Nashville, Tenn.		June 4, 1902
Twyman, Aaron. Engr., Constr. Dept., The Pullman Co., 5 Florence Boulevard, Pullman, Ill.		Mar. 2, 1898
Tye, William Francis. Asst. Chf. Engr., Canadian Pacific Ry. Co., Montreal, Que., Canada		Sept. 1, 1897
Tyson, Anderson Harvey. Glenridge, N. J.		Oct. 2, 1889
Uhlig, Carl. Chf. Draftsman, Board State Harbor Commrs., Ferry Bldg., San Francisco, Cal.		Oct. 7, 1903
Upham, Charles Clifton. Vice-Pres. and Gen. Mgr., New York Steam Co., 143 Liberty St., New York City		April 7, 1897
Value, Beverly Reid. Engr. in Chg., Elec. Development Co. of Ontario, Ltd., Niagara Falls, Ont., Canada		Jan. 2, 1901
Van Buren, John D. New Brighton, Borough of Richmond, N. Y.		May 20, 1868
Van Buren, Robert. 58 West Ave., Norwalk, Conn.		June 17, 1868
Van der Hoek, Jacobus. Div. Engr., Lehigh Val. R. R. Co., 25 Ripley Pl., Buffalo, N. Y.		April 7, 1897

		Date of Membership.
Vandevanter, Charles Oscar. (Vandevanter & Hood), 920 Equitable Bldg., Baltimore, Md.		Sept. 2, 1896
VAN HOESEN, EDMUND FRENCH. (*Director*). Res. Engr., Western Dist., N. Y. C. & H. R. R. R., 145 Washington St., Buffalo, N. Y.		July 1, 1891
Van Horne, John Garret. 29 Broadway, New York City		Feb. 4, 1880
Van Orden, Charles Hopkins. Catskill, N. Y		June 1, 1898
Van Ornum, John Lane. Prof. of Civ. Eng., Washington Univ., St. Louis, Mo.	Assoc. M. M.	Oct. 3, 1894 Oct. 4, 1899
Van Sant, Robert Lawrence. Contr. Civ. Engr., Third National Bank Bldg., St. Louis, Mo.		Sept. 3, 1884
Van Winkle, Edgar Beach. 115 East 70th St., New York City		Dec. 2, 1868
Vaughan, George Washington. Div. Engr., Western Div., N. Y. C. & H. R. R. R., 145 Washington St., Buffalo, N. Y.	Jun. M.	Mar. 3, 1886 Nov. 4, 1896
Vaughn, George Washington. Engr. in Chg., Joint Track Elevation, A., T. & S. F. Ry. Co., C., M. & N. R. R. Co. and C. & A. Ry. Co., 2476 Archer Ave., Chicago, Ill.		June 3, 1891
Vielé, Maurice Augustus. Civ. and Hydr. Engr., 44 Broad St., New York City	Jun. Assoc. M. M.	Feb. 4, 1891 Sept. 7, 1892 Oct. 6, 1897
von Geldern, Otto. U. S. Asst. Engr., 89 Flood Bldg., San Francisco, Cal.		May 4, 1892
von Leer, Isaac Wayne. 813 Crozer Bldg., Philadelphia, Pa.		May 3, 1899
von Schon, Hans August Evald Conrad. Cons. Engr., Sault Ste. Marie, Mich.		Sept. 2, 1902
Voorhees, Theodore. First Vice-Pres., P. & R. Ry. Co., Philadelphia, Pa.		May 6, 1885
Vorce, Clarence Browning. Chf. Civ. Engr., The John F. Kelly Eng. Co., 119 Broadway, New York City.	Jun. Assoc. M. M.	April 30, 1895 Oct. 7, 1896 May 2, 1900
Waddell, John Alexander Low. (Waddell & Hedrick, Cons. Engrs.), Kansas City, Mo.		Oct. 5, 1881
Waddell, Montgomery. Cons. Engr., 1 West 101st St., New York City	Jun. M.	Sept. 1, 1886 Sept. 2, 1896
Waddell, Robert William. Gen. Mgr., Gen. Constr. Co., 401 Kemper Bldg., Kansas City, Mo.		Sept. 4, 1901
Wadsworth, Henry Hayes. U. S. Asst. Engr. (Res., 1809 Hughitt Ave.), Superior, Wis.		Oct. 2, 1901
Wagner, Bernard Matthew. Asst. Engr., Dept. of Water Supply, Gas and Electricity, City of New York (Res., 257 East 12th St., Flatbush, Brooklyn, N.Y.).	Assoc. M. M.	May 3, 1899 Dec. 1, 1903
Wagner, Samuel Tobias. Asst. Engr., P. & R. Ry., 602 Reading Terminal, Philadelphia, Pa.		Feb. 2, 1887
Wainwright, Jonathan. 32 South Broad St., Philadelphia, Pa.		Feb. 3, 1892
Wait, John Cassan. Attorney and Counsellor-at-Law (Eng. and Architectural Jurisprudence), 220 Broadway, New York City.		Feb. 3, 1892
Waldo, Mark Albigense. 226 Third Ave., Leavenworth, Kans.		May 2, 1900

		Date of Membership.
Walker, Elton David. Prof. of Hydr. and San. Eng., The Pennsylvania State Coll., State College, Pa....	Jun. Assoc. M. M.	Oct. 4, 1892 June 1, 1898 Sept. 5, 1900
Walker, Jesse Wager. Room 207, Bissell Blk., Pittsburg, Pa......		May 7, 1884
Walker, John Shaw. Office of Chf. Engr. for Existing Lines, West Australia Govt. Rys., Wellington St., Perth, Western Australia..........................	Assoc. Assoc. M. M.	May 1, 1894 Mar. 3, 1897 Mar. 6, 1901
Walker, John Simpson. U. S. Asst. Engr., Nashville, Tenn.........		Jan. 5, 1881
R. WALLACE, JOHN FINDLEY. (*Past-President*). Gen. Mgr., Ill. Cent. R. R. Co., 1 Park Row, Chicago, Ill..		June 2, 1886
Wallace, John Herbert. Engr., M. of W., S. P. Co. (Pacific System), 4 Montgomery St., San Francisco, Cal...............		Jan. 2, 1890
Wallace, Joseph Harrison. (Wallace, Jaastad, Drewsen), Temple Court Bldg., New York City...............	Jun. Assoc. M. M.	Dec. 1, 1896 Dec. 1, 1897 Nov. 6, 1901
Ward, Charles Dod. 702 St. Nicholas Ave., New York City.........		Mar. 3, 1869
Warner, Edwin Hall. Prin. Asst. Engr., Columbia Impvt. Co., Natl. Bank of Commerce Bldg., Tacoma, Wash.	Assoc. M. M.	May 6, 1891 Oct. 4, 1893
Warren, William Henry. Challis Prof. of Eng., Univ. of Sydney, Sydney, New South Wales, Australia		Feb. 5, 1890
Washburn, Frank Sherman. Cons. Engr., Nashville, Tenn..........		Nov. 7, 1888
Wason, Leonard Chase. Pres. and Mgr., Aberthaw Constr. Co., 8 Beacon St., Boston (Res., 199 Harvard St., Brookline, Mass.)	Assoc. M. M.	April 3, 1901 April 1, 1903
Waterhouse, John. Cons. Engr., 29 Broadway, New York City.....		Oct. 4, 1899
Wathen, Benjamin Southern. Chf. Engr., Tex. & Pac. Ry., Dallas, Tex.		Nov. 2, 1892
Watkins, Frederick William. Div. Engr., Aqueduct Comm., New York (Res., 45 Rockledge Ave.), White Plains, N. Y		Oct. 3, 1883
Watkins, Richard. 8 Mears Ave., Randwick, near Sydney, New South Wales, Australia.......		Dec. 3, 1890
Watson, William. Secy., Am. Acad. of Arts and Sciences, 107 Marlborough St., Boston, Mass...................	Assoc. M.	Mar. 1, 1882 Sept. 2, 1891
Watson, William Parsons. Columbia, Maury Co., Tenn		June 1, 1887
Watt, David Alexander. U. S. Asst. Engr., U. S. Engr. Office, Galveston, Tex...		Feb. 6, 1901
Watt, John Marshall Gilkison. U. S. Engr. Office, Chattanooga, Tenn...		Feb. 5, 1902
Webb, George Herbert. Asst. Chf. Engr., Mich. Cent. R. R., Detroit, Mich...		Feb. 1, 1893
Weber, Alexander Hamilton. U. S. Asst. Engr., Colorado Bldg., Washington, D. C..		Oct. 3, 1900
Webster, Charles Edward. Cons. Engr., Buffalo & Susquehanna Ry. Co., 960 Ellicott Sq., Buffalo, N. Y.........................		Oct. 4, 1899
WEBSTER, GEORGE SMEDLEY. (*Director*). Chf. Engr. and Surv., Bureau of Surveys, City Hall, Philadelphia, Pa...................................	Assoc. M. M.	Sept. 7, 1892 Oct. 4, 1893
Webster, William Richardson. Cons. and Insp. Engr., 411 Walnut St., Philadelphia, Pa..		April 5, 1899

MEMBERS W

		Date of Membership.
Wegmann, Edward. Div. Engr., New York Aqueduct Comm., Katonah, N. Y.		Mar. 7, 1888
Weinhagen, Fred. Pres., Wisconsin Bridge & Iron Co., 706 Pabst Bldg., Milwaukee, Wis.		July 4 1888
Weiskopf, Samuel C. Chf. Engr., Thompson-Starrett Co., 51 Wall St., New York City	Jun. M.	May 7, 1884 Dec. 5, 1888
Wellman, Samuel Thomas. Pres., The Wellman-Seaver-Morgan Co., New England Bldg., Cleveland, Ohio		Oct. 5, 1898
Wells, Charles Edwin. Engr., Reservoir Dept., Met. Water-Works, Clinton, Mass.		June 1, 1892
Wells, James Hollis. 32 Nassau St., New York City		Feb. 5, 1901
Wendt, Edwin Frederick. Asst. Engr., Pitts. & Lake Erie R. R., Pittsburg, Pa.		Oct. 7, 1903
Wentworth, Charles Chancellor. Prin. Asst. Engr., Norfolk & West. Ry., Roanoke, Va.		April 4, 1888
West, Charles Hunter. Chf. Engr., Mississippi Levee Dist., Greenville, Miss.		Oct. 1, 1902
Westinghouse, George, Jr. Pittsburg, Pa.		Jan. 7, 1891
Weston, Charles Valentine. Chf. Engr., So. Side Elev. R. R. Co., 450 Thirty-seventh Pl., Chicago, Ill.		Sept. 5, 1900
Weston, Edmund Brownell. Cons. Engr., 86 Weybosset St., Providence, R. I.		Dec. 6, 1882
Wetherbee, George Albert. City Engr., Malden, Mass.		April 5, 1893
Wetherill, William Chattin. Cons. Engr., The Empire Zinc Co., 820 Equitable Bldg., Denver, Colo.		Dec. 1, 1886
Wheeler, Daniel Merrick. State R. R. Insp., 315 Salisbury St., Worcester, Mass.		Mar. 6, 1901
Wheeler, Ebenezer Smith. U. S. Asst. Engr., 76 Delaware Ave., Detroit, Mich.		Nov. 7, 1883
Wheeler, Levi Lockwood. Asst. U. S. Engr., Sterling, Ill.		June 4, 1884
Wheeler, Schuyler Skaats. Pres., Crocker-Wheeler Co., Ampere, N. J.	Jun. M.	Mar. 2, 1887 Feb. 6, 1889
Wheeler, William. Cons. Engr., 14 Beacon St., Boston, Mass.		Oct. 4, 1893
Whinery, Samuel. Cons. Engr., 95 Liberty St., New York City	Jun. M.	April 1, 1874 May 4, 1881
Whistler, John T. Engr., Reclamation Service, U. S. Geological Survey, Washington, D. C.	Assoc. M. M.	Jan. 2, 1901 Oct. 7, 1903
Whistler, Thomas Delano. Care, Brown, Shipley & Co., 123 Pall Mall, London, England	Jun. M.	Mar. 5, 1884 May 2, 1888
Whitcomb, Henry Donald. Richmond, Va.		Feb. 21, 1872
White, George Howard. Sewer Dept. (Res., 20 Shattuck St.), Worcester, Mass.		May 2, 1883
White, Henry Fisher. Engr., M. of W., C., R. I. & P. Ry., Chicago, Ill.		Jan. 2, 1890
White, Timothy Sidney. V.-P. and Chf. Engr., Penn Bridge Co., Beaver Falls, Pa.		April 3, 1889
Whitford, Reid. U. S. Asst. Engr., Georgetown, S. C.		Dec. 2, 1896
Whitmer, David Heikes. Prin. Asst. Engr., Am. Pipe Mfg. Co., 112 North Broad St., Philadelphia, Pa.		May 6, 1903

		Date of Membership.
Whitney, Frank Ormond. Chf. of Surveying, Div. of the Eng. and Street Laying-Out Depts., 25 Old Court House, Boston, Mass.	Jun. M.	May 3, 1876 Jan. 5, 1887
WHITTEMORE, DON JUAN. (*Past-President*). Chf. Engr., C., M. & St. P. Ry. Co., 360 Old Colony Bldg., Chicago, Ill. (Res., 222 Biddle St., Milwaukee, Wis.)		July 10, 1872
Whitten, Nathan Hollis. Engr., Holyoke Machine Co., Holyoke, Mass.		June 7, 1876
Wiest, Julius Christian. Chf. Engr. and Contr., Central Div., Nicaragua R. R., Managua, Nicaragua		Feb. 5, 1902
Wilcox, Frank. Engr. of The T. A. Gillespie Co., 1123 Westinghouse Bldg., Pittsburg, Pa.		Oct. 7, 1903
Wiley, Andrew Jackson. Cons. Hydr. Engr., Boise, Idaho		Dec. 5, 1894
Wiley, William Halsted. 43 East 19th St., New York City		Feb. 17, 1869
WILGUS, WILLIAM JOHN. (*Director*). Fifth Vice-Pres., N. Y. C. & H. R. R. R., Grand Central Station, New York City		April 1, 1896
Wilkins, William Glyde. Care, The W. G. Wilkins Co., Engrs. and Archts., Westinghouse Bldg., Pittsburg, Pa.		Dec. 4, 1889
Willard, James Eager. 27 Kennedy Pl., Louisville, Ky.		May 1, 1889
Williams, Chauncey Grant. 25 Clinton St., Brooklyn, N. Y.	Assoc. M. M.	Feb. 6, 1895 Oct. 7, 1903
Williams, Cyrus John Richard. Engr., Lyttelton Harbour Board, Christchurch, New Zealand		Feb. 6, 1901
Williams, David. Asst. Engr. B. & M. R. R., St. Johnsbury, Vt.		May 4, 1898
Williams, Edward Gilbert. Res. Engr. and Supt., The New York Continental Jewell Filtration Co., First St. Tunnel, P. R. R., 23 D St., S. E., Washington, D. C.		Feb. 3, 1897
N. Williams, Gardner Stewart. Engr. in Chg. of Hydr. Laboratory, and Prof. of Experimental Hydraulics, Cornell Univ.; Cons. Engr., 109 Valentine Pl., Ithaca, N. Y.	Assoc. M. M.	Oct. 2, 1895 Dec. 6, 1899
Williamson, Francis Stuart. Cons. Engr., 25 Broad St., New York City		Sept. 7, 1887
Williamson, Sydney Bacon. U. S. Asst. Engr., Newport, R. I.	Assoc. M. M.	Jan. 3, 1894 Dec. 2, 1896
Willis, Paul. Secy. and Engr., Kenwood Bridge Co., 45 Madison Park, Chicago, Ill.		Oct. 2, 1901
Wilson, Charles Alfred. Chf. Engr., Cin., Hamilton & Dayton Ry. Co., Cincinnati, Ohio		April 1, 1891
Wilson, Charles Beatty. Bridge Superv., N. C. & St. L. Ry., Tullahoma, Tenn.		Dec. 2, 1903
Wilson, Elliott Hinckley. Civ. and Min. Engr. (Receiver of the Minnie Healey Mine), Butte, Mont.		Feb. 1, 1888
Wilson, George Leverett. Engr. and Roadmaster, Twin City Rap. Trans. Co., Minneapolis, Minn.		Feb. 5, 1890
Wilson, Henry William. Archt. and Cons. Engr. (Wilson, Harris & Richards), 1030 Drexel Bldg., Philadelphia, Pa.		Sept. 6, 1876
Wilson, Herbert Michael. Geographer, U. S. Geological Survey, Washington, D. C.	Jun. M.	Sept. 5, 1883 Jan. 2, 1890

		Date of Membership.
Wilson, Winter Lincoln. Asst. Prof. in Chg., Dept. Civ. Eng., Tulane Univ. of La., New Orleans, La.		May 1, 1901
Wimmer, Sebastian. St. Mary's, Elk Co., Pa.		Mar. 2, 1881
Wingfield, Nisbet. Cons. Engr., Augusta, Ga.		May 1, 1895
Wisner, George Monroe. Asst. Chf. Engr., San. Dist. of Chicago, 1010 Security Bldg., Chicago, Ill.		Feb. 4, 1903
Wisner, George Y. Civ. and Cons. Engr.; Cons. Engr. for U. S. Reclamation Service, 39 West Canfield Ave., Detroit, Mich.		April 5, 1876
Woermann, John William. Engr. in Chg., Survey of Illinois and Des Plaines Rivers, 1115 N. Monroe St., Peoria, Ill.	Assoc. M. M.	May 1, 1895 May 7, 1902
Wölfel, Paul Ludwig. Chf. Engr., Am. Bridge Co., Ambridge, Pa.	Jun. Assoc. M. M.	July 3, 1889 July 1, 1891 Nov. 6, 1895
Wolverton, Irving Mason. Chf. Engr., The Mt. Vernon Bridge Co., Mt. Vernon, Ohio	Assoc. M. M.	Dec. 4, 1895 Dec. 1, 1903
Wood, Henry Beecher. Asst. Engr., Harbor and Land Comm., Room 134, State House, Boston, Mass.		April 3, 1895
Wood, Joseph. Second Vice-Pres., Penn. Lines W. of Pitts., Room 915, Union Station, Pittsburg, Pa.		April 1, 1874
Woodbury, Charles Jeptha Hill. Asst. Engr., Am. Telephone & Telegraph Co., 125 Milk St., Boston, Mass.		Dec. 3, 1884
Woodruff, Edward Lowrey. Asst. Engr., Ninth Light-House Dist., Milwaukee, Wis.		Oct. 3, 1900
Woods, Henry Dickinson. 99 Highland St., West Newton, Mass.	Assoc. M. M.	Mar. 1, 1893 June 5, 1895
C. **Woods, Robert Patterson.** Chf. Engr., Townsend, Reed & Co., Ry. Builders, 1208 Stevenson Bldg., Indianapolis, Ind.	Jun. Assoc. M. M.	Feb. 2, 1897 Mar. 7, 1900 April 1, 1903
Woolley, Andrew Feaster. Cons. and Contr. Engr., Calle Damas 131, Tampico, Mexico		Dec. 2, 1903
Worcester, Joseph Ruggles. Cons. Engr., 53 State St., Boston, Mass.		Jan. 2, 1895
Worthington, Charles. Cons. Engr., 1322 Farmers Bank Bldg., Pittsburg, Pa.	Assoc. M. M.	Dec. 1, 1897 Nov. 6, 1901
Wright, Augustine Washington. Cons. Engr., Pomona, Cal.		May 5, 1886
Wright, Charles Herbert. Chf. Engr., Brown Hoisting Machinery Co., Belden and St. Clair Sts., Cleveland, Ohio		Oct. 5, 1892
Wright, Edward Thomas. 226 South Spring St., Los Angeles, Cal.		Feb. 3, 1886
Wright, Willis Benton. Div. Engr., Sewerage and Water Board, 20 City Hall, New Orleans, La.		Nov. 3, 1897
Wrotnowski, Arthur Francis. Hermosillo, Sonora, Mexico		July 12, 1877
Yamaguchi, Junnosuke. Chf. Engr., Sanyo Ry. Co., Kobe, Japan		Mar. 4, 1903
Yates, Preston King. First Asst. Engr., L. S. & M. S. R. R., 67 Spangler Ave., Cleveland, Ohio	Jun. M.	June 6, 1883 April 5, 1893
Yeatman, Charles Pope. Mgr., Barranquilla Ry. & Pier Co., Barranquilla, Colombia		Feb. 2, 1887

			Date of Membership.
	Yeatman, Morgan Edward. Care, S. Pearson & Son, Ltd., 10 Victoria St., London, S. W., England		May 4, 1892
	Yeatman, Pope. Randfontein Estates Gold Min. Co., Ltd., Randfontein, Transvaal, South Africa		Oct. 4, 1893
	Yonge, Samuel Humphreys. U. S. Asst. Engr. in Chg. of Impvt., James River, Va., and Protection of Jamestown Island, Va., U. S. Engr. Office, 28 North 9th St., Richmond, Va		May 5, 1880
C.	York, Herbert Waldo. Chf. Engr., Am. Smelting & Refining Co., 71 Broadway, New York City	Jun. M.	May 2, 1888 June 3, 1896
	Young, John. Geneseo, N. Y		Mar. 7, 1888
	Young, Roscoe Cyprian. Locating Engr., C., R. I. & P. Ry., Iowa Falls, Iowa		Oct. 1, 1902
	Ziesing, August. Western Mgr., Am. Bridge Co., 1315 Monadnock Blk., Chicago, Ill		Oct. 5, 1898
	Ziffer, Emanuel A. Pres. of the Council of Adm. of the Imp. Royal Privileged Lemberg-Czernowitz and Jassy Ry. Co., I Opernring 5, Vienna, Austria		June 7, 1893
	Zinn, George Arthur. Maj., Corps of Engrs., U. S. A., U. S. Engr. Office, Wheeling, W. Va		Feb. 3, 1904
	Zollinger, Luther Reese. Prin. Asst. Engr., P. R. R. Div., Altoona, Pa		Mar. 6, 1901
	Zook, Morris Alexander. Plainfield, N. J		Oct. 4, 1899

Members, 1 670.

ASSOCIATE MEMBERS.

[Assoc. M. Am. Soc. C. E.]

		Date of Membership.
Abella, Juan. Cons. Engr., Buenos Aires & Belgrano Elec. Tramways Co., 691 Calle Bolivar, Buenos Aires, Argentine Republic.		Jan. 6, 1897
Adams, Edwin Griggs, Jr. Cons. Civ. and Mech. Engr. (Adams & Knowles), No. 2, The Bund, Tientsin, China		Jan. 1, 1896
Adams, Julius Le Roy. Chf. Engr., Hartford, Manchester & Rockville Tramway Co., South Manchester, Conn	Jun. Assoc. M.	Jan. 4, 1888 April 5, 1899
Adey, William Henry. 181 Main St., Cohoes, N. Y.	Jun. Assoc. M.	Feb. 4, 1896 Dec. 3, 1902
Adgate, Frederick Whitney. Supt. for Foundation & Contr. Co. Omaha, Nebr.		Jan. 6, 1904
Affelder, Louis Jacob. Contr. Engr., Central Div., Am. Bridge Co. of N. Y., Frick Bldg., Pittsburg, Pa.	Jun. Assoc. M.	Feb. 4, 1896 June 5, 1901
Albree, Ralph. 1115 Market St. (Res., 1112 Western Ave.), Allegheny, Pa	Jun. Assoc. M.	Oct. 4, 1898 Oct. 1, 1902
Alden, Charles Ames. Chf. Draftsman, F., S. & S. Dept., The Pennsylvania Steel Co., Steelton, Pa.		May 4, 1898
Alden, Herbert Clarendon. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, Kingsbridge, New York City		Mar. 1, 1893
Allan, Alexander George. Asst. Engr., Grand Trunk Pacific Ry., P. O. Box 68, Winnipeg, Man., Canada		Mar. 6, 1901
Allen, Frank William. 5 West 125th St., New York City	Jun. Assoc. M.	Nov. 3, 1896 May 4, 1898
Allen, Henry Clayton. Res. Engr., Dept., State Engr. and Surv., New York State Canals, Syracuse, N. Y.		July 1, 1891
Allen, Walter Hinds. Civ. Engr., U. S. N., Navy Yard, Brooklyn, N. Y.	Jun. Assoc. M.	May 1, 1900 Nov. 4, 1903
Allen, William Andrew. Supt. of Constr., Perth Amboy Plant, Am. Smelting & Refining Co., Maurer, N. J.		Feb. 6, 1901
Allen, William Frederick. Secy. and Treas., Am. Ry. Assoc., 24 Park Pl., New York City		Jan. 3, 1900
Ames, George Marshall. 121 Ottawa St., Grand Rapids, Mich.		June 7, 1899
Anderson, David Guy. U. S. Asst. Engr., Engr. Office, U. S. A., Mobile, Ala.		Oct. 4, 1899
Andros, Frederic William. Div. Engr., Mex. International R. R., Durango, Mexico		Feb. 1, 1899

		Date of Membership
Arango, Ricardo Manuel. Insp. Gen. of Health, Panama, Panama		Sept. 2, 1896
Archer, Stevenson, Jr. Res. Engr., Mo. Pac. Ry., Natchez, Miss.		Nov. 3, 1897
Armitage, George Washington. Quartermaster Dept., U. S. A., Dodge, Walker Co., Ga.		April 2, 1902
Ash, Dorsey. Supt. of Constr., U. S. Court House and Post Office, Salt Lake City, Utah		June 3, 1903
Ashbaugh, Lewis Eugene. Asst. Prof. of Civ. Eng., Iowa State Coll., Ames, Iowa		Jan. 7, 1903
Ashbridge, Richard I. Downing. East Downingtown, Pa.		Sept 3, 1902
Atkins, Harold Bedford. Cons. Engr., 22 William St., New York City		April 2, 1902
Auryansen, Frederick. Chf. Draftsman, Atlantic Ave. Impvt., L. I. R. R., 44 Court St., Brooklyn, N. Y.	Jun.	Oct. 5, 1897
	Assoc. M.	Dec. 3, 1902
Aylett, Philip. Bridge Engr., S. A. L. Ry., Portsmouth, Va		June 3, 1896
Ayres, Clarence Morton. Engr., Central Iron & Coal Co., Holt, Ala.		Oct. 2, 1901
Babb, Cyrus Cates. Engr., U. S. Geological Survey, Washington, D. C.	Jun.	Feb. 2, 1892
	Assoc. M.	Feb. 3, 1897
Bacon, George Morgan. 624 Dooly Blk., Salt Lake City, Utah		Dec. 3, 1902
Bailey, William Melvin. Engr. for Eastern Expanded Metal Co., Paddock Bldg., Boston (Res., 29 Auburn St., Malden), Mass.		Sept. 5, 1900
Baird, Samuel Pond. Gen. Mgr., The Portsmouth St. R. R. & Light Co., Portsmouth, Ohio		Mar. 1, 1899
Baker, Elisha Brown. Morgantown, W. Va.		April 1, 1896
Baker, Henry Erskine. City Engr. and Engr. of Water Board, Watertown, N. Y.		May 7, 1902
Baker, Shirley. Mgr., Excelsior Wooden Pipe Co., 204 Front St., San Francisco, Cal.	Jun.	Sept. 11, 1900
	Assoc. M.	June 3, 1903
Balch, William Hoyt. Engr., Aberthaw Constr. Co., 8 Beacon St., Boston, Mass		April 1, 1903
Baldwin, Ernest Howard. Asst. Engr., Met. Water-Works, Oakdale, Mass.		May 4, 1898
Baldwin, Hiram Ellsworth. 32 Earle Ave., Glenville, Ohio		Jan. 2, 1895
Bance, Charles William. Asst. Engr., Jersey City Water Supply Co., 156 Ellison St., Paterson, N. J.		Mar. 5, 1902
Bandy, James Marcus. City Engr., Greensboro, N. C.		Feb. 4, 1903
Banks, John Edwin. Detail Checker, Am. Bridge Co., Pittsburg, Pa.		June 4, 1902
Bantel, Edward Christian Henry. Instr. in Civ. Eng., Univ. of Texas, 2600 Whitis Ave., Austin, Tex.		Feb. 4, 1903
Barnes, Mortimer Grant. U. S. Junior Engr., R. F. D. No. 2, Geneseo, Ill.		Nov. 2, 1898
Barnes, William Thomas. Asst. to Leonard Metcalf, 14 Beacon St., Boston (Res., 773 Broadway, South Boston), Mass.		Sept. 7, 1898
Barnett, Robert Crary. 3023 East 20th St., Kansas City, Mo.		Dec. 5, 1900
Barney, Percy Canfield. Dept. of Yards and Docks, U. S. Navy Yard, Brooklyn, N. Y.	Jun.	Mar. 3, 1896
	Assoc. M.	June 5, 1901

ASSOCIATE MEMBERS B

		Date of Membership.
Barnsley, George Thomas. Res. Engr. in Chg. of Constr., Monongahela River Bridge and Pittsburg Terminals. Wabash System, 39 Second Ave., Pittsburg, Pa.	Jun. Assoc. M.	May 31, 1892 Mar. 7, 1894
Barr, Joseph Carroll. Engr., Liberty Land Co., Economy, Pa.		Jan. 4, 1899
Barrows, Harold Kilbreth. Assoc. Prof. Civ. Eng., Univ. of Vermont, Burlington, Vt.		Jan. 6, 1904
Bartoccini, Astolfo. With O'Rourke Eng. Constr. Co., 26 Nassau St., New York City		May 6, 1903
Bartram, George Corrie. Res. Engr., Phœnix Bridge Co., 110 State St., Boston, Mass.	Jun. Assoc. M.	Jan. 31, 1899 Sept. 2, 1902
Bascom, Harry Franklin. (Lehr & Bascom), 7 South Seventh St., Allentown, Pa.	Jun. Assoc. M.	Dec. 5, 1899 Sept. 4, 1901
Bascome, Western Radford. Asst. Engr., Dept. of Bridges, New York City	Jun. Assoc. M.	Dec. 3, 1891 May 5, 1897
Basinger, James Garnett. Asst. Engr., Dept. Docks and Ferries, 243 West 131st St., New York City		Oct. 3, 1900
Bauer, Jacob Louis. 68 Bible House, New York City.		Feb. 5, 1896
Baum, George. Representative, Westinghouse, Church, Kerr & Co., Engrs., P. O. Dunwoody, Ga.	Jun. Assoc. M.	Jan. 4, 1892 Apr. 5, 1899
Bausher, Carmi Irving. Asst. Engr., B. & C. Dept., The Penna. Steel Co., Steelton, Pa., 136 North 13th St., Harrisburg, Pa.		Dec. 7, 1898
Bayliss, John Yancey. Asst. Engr., St. L. & San Fran. R. R. Co., P. O. Box 41, Osceola, Ark.		Sept. 2, 1903
Beach, James George. Apalachin, Tioga Co., N. Y	Jun. Assoc. M.	Aug. 31, 1897 Sept. 2, 1903
Beerbower, George Marshall. New York Zoological Park, New York City		Oct. 7, 1903
Bell, Alfred Carroll. Contr. Engr., Wisconsin Bridge & Iron Co., 522 Colorado Bldg., Denver, Colo.	Jun. Assoc. M.	May 2, 1893 Jan. 2, 1901
Bellows, Oscar Francis. Supt. of Constr., Q. M. Dept., U. S. A., Fort Ontario, N. Y.; Address, 159 East Third St., Oswego, N. Y.		Dec. 4, 1901
Bentzon, Adrian Benoni. Div. Engr., Cerro de Pasco Ry., Cerro de Pasco, Peru		Mar. 6, 1901
Bergengren, Fritz Carl Anders Georg. Cons. Engr., 14 South Market Sq., Harrisburg, Pa.		Dec. 2, 1896
Berger, Bernt. Asst. to Theodore Cooper, 35 Broadway, New York City		April 5, 1893
Bettes, Charles Robert. Chf. Engr., Queens Co. Water Co., Far Rockaway, N. Y.	Jun. Assoc. M.	Oct. 1, 1890 June 7, 1893
Betts, Edward Everett. Engr. in Chg., Chickamauga and Chattanooga National Military Park, Chattanooga, Tenn.		April 5, 1899
Betts, Romeo Thompson. Asst. Engr., Dept. Docks and Ferries, Foot of East 24th St., New York City		Oct. 3, 1900
Bishop, William Israel. Supt., Pittsburgh Reduction Co., Massena, N. Y.		Feb. 6, 1901
Blanchard, Murray. Junior Engr., U. S. Lake Survey, 33 Campau Bldg., Detroit, Mich.		April 2, 1902

		Date of Membership.
Bland, Miles Carlisle. Contr. Mgr., Am. Bridge Co. of N. Y., 418 Chamber of Commerce Bldg., Cleveland, Ohio		Sept. 3, 1902
Blodgett, John. Care, Am. Bridge Co., Ambridge, Pa.	Jun. Assoc. M.	Dec. 4, 1889 Jan. 2, 1901
Boardman, Harold Sherburne. Assoc. Prof. of Civ. Eng., Univ. of Maine, Orono, Me		Feb. 3, 1904
Boatrite, James Edwin. 190 Convent Ave., New York City	Jun. Assoc. M.	Feb. 5, 1895 Nov. 3, 1897
Boecklin, Werner. 11 Broadway, Room 1155, New York City	Jun. Assoc. M.	Mar. 1, 1892 Dec. 1, 1897
Bogen, Louis Edward. In Chg. of Estimating Eng. of Bullock Elec. Mfg. Co., Norwood, Ohio; Address, 1855 Hewitt Ave., W. H., Cincinnati, Ohio	Jun. Assoc. M.	April 30, 1895 June 4, 1902
Boller, Alfred Pancoast, Jr. The Westinghouse Machine Co., 10 Bridge St., New York City	Jun. Assoc. M.	Oct. 2, 1894 May 3, 1899
Bonnett, Charles Pierre. 421 Westminster Ave., Elizabeth, N. J	Jun. Assoc. M.	June 2, 1886 Mar. 6, 1901
Boright, William Parsons. (With Pepper & Register, Philadelphia, Pa.) People's Trust & Savings Bank Bldg., Clinton, Iowa	Jun. Assoc. M.	Jan. 2, 1894 Mar. 1, 1899
Bourne, Thomas Johnstone. (S. Pearson & Sons, Ltd.), Tientsin, China		Feb. 7, 1900
Bowen, Edmund Ignatius. Roadmaster, Allegheny Div., Erie R. R. Co., Hornellsville, N. Y		Nov. 1, 1899
Bowman, Joseph Hockman. Chf. Engr., Pan-American R. R., Tonalá, Chiapas, Mexico		Dec. 2, 1903
Boyd, James Churchill. Asst. Engr., with Westinghouse, Church, Kerr & Co., 21 State St., Room 715, New York City	Jun. Assoc. M.	Sept. 3, 1895 May 1, 1901
Brace, James Henry. Care, P., N. Y. & L. I. R. R., 20 West 34th St., New York City		Jan. 2, 1901
Bradshaw, Sam Wigfall. Asst. Engr., Estimating Dept., Bridge & Constr. Dept., Pennsylvania Steel Co., Steelton, Pa.	Jun. Assoc. M.	Oct. 2, 1900 Feb. 4, 1903
Branch, Thomas Pettus. Prof., Civ. Eng., Georgia School of Technology, Atlanta, Ga.		Feb. 5, 1902
Branne, John Severin. Structural Engr.; Secy., James E. Brooks Co., Cons. Engrs., 45 Broadway, New York City (Res., 145 Chester St., Mt. Vernon, N. Y.)		Oct. 5, 1898
Braune, Gustave Maurice. 230 N. 2d St., Harrisburg, Pa.	Jun. Assoc. M.	June 2, 1896 Sept. 4, 1901
Braxton, Jaquelin Marshall. U. S. Asst. Engr., U. S. Engr. Office, Key West, Fla	Jun. Assoc. M.	Jan. 5, 1897 May 3, 1899
Breed, Charles Blaney. Instr. in Civ. Eng., Mass. Inst. Tech., Boston, Mass		May 6, 1903
Brenneke, William George. (Brenneke & Fay, Cons. Civ. Engrs.), 1009 Fullerton Bldg., St. Louis, Mo		Mar. 5, 1902

		Date of Membership.
Brereton, Thomas John. Engr., Cumberland Val. R. R., Chambersburg, Pa.	Jun. Assoc. M.	Oct. 7, 1885 June 5, 1895
Bright, Charles Edwin. Res. Engr., K., L. F. & J. R. R., Dossetts, Tenn.		Dec. 3, 1902
Brook-Fox, Evelyn. Asst. Engr., East Indian Ry., Care, Grindlay & Co., Calcutta, India		Feb. 2, 1898
Brooks, John Pascal. Prof. of Civ. Eng., Coll. of Kentucky, 231 North Broadway, Lexington, Ky.		April 1, 1896
Brower, Edward Sylvester. Asst. Engr., Bklyn. Hts. R. R. Co., 164 Montague St., Brooklyn, N. Y.		Dec. 2, 1903
Brown, Maurice Fritchley. Chf. Engr. of Boston Bridge Works, 47 Winter St., Boston, Mass.		Mar. 4, 1903
Brown, Robert King. Div. Engr., M. of W., S. P., L. A. & S. L. R. R. Co., Salt Lake City, Utah		June 7, 1893
Browne, James Simpson. Div. Engr., N. Y., N. H. & H. R. R., 309 Union Station, Providence, R. I.		Oct. 4, 1893
Browning, George Elliot. Chf. Engr., Cochin Govt., Rose Bank, Trichur, S. India		May 7, 1902
Brydone-Jack, Ernest Edmund. Dean of the Eng. Faculty, Univ. of New Brunswick, and City Engr., Fredericton, N. B., Canada		Oct. 4, 1899
Brynn, Per. Care, Am. Bridge Co., 51st St., Pittsburg, Pa.		Feb. 4, 1903
Bryson, Thomas Bines. 2139 Park Row Bldg., New York City		Feb. 7, 1900
Burchard, Anson Wood. 21 Front St., Schenectady, N. Y.		May 3, 1893
Burden, Morton. Care, Eng. Dept., Am. Bridge Co., Ambridge, Pa.	Jun. Assoc. M.	Feb. 4, 1896 Jan. 2, 1901
Burgess, George Heckman. Asst. Engr., Pennsylvania Lines, 1116 Union Station, Pittsburg, Pa.	Jun. Assoc. M.	Feb. 1, 1898 June 3, 1903
Burns, Clinton Sumner. Civ., Hydr. and San. Engr. (Burns & McDonnell), Postal Telegraph Bldg., Kansas City, Mo.		Feb. 1, 1899
Burns, James Ferguson. Roadmaster, L. & N. R. R., Lebanon, Ky.	Jun. Assoc. M.	Oct. 1, 1895 Sept. 6, 1899
Burns, Justin. Hankow-Canton Ry., Am. China Development Co., Canton, China		April 6, 1898
Burrowes, Harry Gilbert. Res. Engr., Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl., Brooklyn, N. Y.	Jun. Assoc. M.	Sept. 2, 1902 Feb. 3, 1904
Bush, Edward Wallace. Asst. Engr., Conn. River Bridge and Highway Dist. Comm., Ætna Life Bldg., Hartford, Conn.		April 5, 1899
Campbell, Albert Johnstone. Broad St. Ave., London, E. C., England		May 2, 1894
Campbell, Arthur Ira. Div. Engr., St. L. & San Fran. R. R. Co., Granite Blk., St. Louis, Mo.		Dec. 2, 1903
Carlile, Thomas Jenks. 4215 Chestnut St., Philadelphia, Pa.	Jun. Assoc. M.	Mar. 3, 1896 Mar. 6, 1901
Carney, Edward Joseph. Dept. of Bridges, 19 Park Row (Res., 527 West End Ave.), New York City	Jun. Assoc. M.	Feb. 1, 1898 April 1, 1903
Carpenter, Allan Wadsworth. Div. Engr., N. Y. C. & H. R. R. R., Jersey Shore, Pa.	Jun. Assoc. M.	Mar. 5, 1901 April 1, 1903
Carter, Alfred Ellsworth. Columbia Univ., New York City		June 4, 1902

		Date of Membership.
Carter, Richard William. Asst. Engr., Mo. Val. Bridge & Iron Works, Leavenworth, Kans.		Oct. 1, 1902
Carter, Shirley. Norfolk, Va.	Jun. Assoc. M.	May 31, 1892 Oct. 5, 1898
Carter, William J. City Engr. (Res., 2042 Woodland Hills Ave.), Cleveland, Ohio	Jun. Assoc. M.	Feb. 5, 1895 Sept. 7. 1898
Chambers, Herbert James. Contr. Engr. for Milliken Bros., 11 Broadway, New York City		Nov. 5, 1902
Chambers, Ralph Hamilton. (Chambers & Howe), 60 New St., New York City		Dec. 1, 1897
Chapleau, Samuel Jefferson. Asst. Engr., Dept. of Public Works, Ottawa, Ont., Canada		May 1, 1901
Charlsworth, William Saxon. Dannevirke, Napier, New Zealand		Nov. 1, 1899
Chase, Richard Davenport. With Allen Hazen, Cons. Engr., 220 Broadway, New York City	Jun. Assoc. M.	Oct. 5, 1897 Oct. 3, 1900
Chester, Charlie Ellsworth. Mgr., City Water Co., Shelbyville, Ill.		May 4, 1898
Christian, George Lyon. Asst. Engr., Bureau of Sewers, Borough of the Bronx, East 177th St. and 3d Ave. (Res., East 238th St., Woodlawn), New York City		Mar. 6, 1895
Christy, George Lewis. 128 West 42d St., New York City	Jun. Assoc. M.	June 6, 1893 Nov. 4, 1896
Clapp, George Hubbard. Chairman, Pittsburgh Testing Laboratory, Ltd., 325 Water St., Pittsburg, Pa.		July 1, 1891
Clark, Edward Cotman. (Swinburne & Clark), 156 Fifth Ave., New York City		Feb. 3, 1904
Clark, Edwin. Structural Engr. and Bldg. Insp., Room 317, City Hall, Bureau of Bldg. Inspection, Philadelphia, Pa.		Jan. 6, 1897
Clark, George Hallett. Senior Asst. Engr., Rapid Transit R. R. Comm., 122 Liberty St. (Res., 406 West End Ave.), New York City	Jun. Assoc. M.	Oct. 3, 1893 April 6, 1898
Coates, Frank Raymond. Chf. Engr., Chic. Gt. West. Ry., St. Paul, Minn.		Jan. 3, 1900
Cole, Burt. Chf. Engr., Consolidated Coal Co. of St. Louis and Western Coal & Min. Co., 164 Laclede Bldg., St. Louis, Mo.		Jan. 2, 1901
Cole, Herbert Nichols. Asst. Engr., Semet-Solvay Co., 721 Van Buren St., Milwaukee, Wis.		Jan. 6, 1904
Coleman, Henry Fitch. Gen. Mgr., Indiana Northern Traction Co., 404 Glass Blk., Marion, Ind.		Mar. 6, 1895
Collier, Bryan Cheves. Asst. Engr., Bureau of Highways, Borough of the Bronx (Res., 2721 Bainbridge Ave.), New York City		Oct. 3, 1900
Collins, Clarke Peleg. Civ. and Min. Engr., 301 Suppes Bldg., Johnstown, Pa.		June 4, 1902
Comstock, Charles Worthington. Civ. and Min. Engr., 213 Boston Bldg., Denver, Colo.	Jun. Assoc. M.	April 5, 1892 Feb. 7, 1900
Conger, Alger Adams. With N. Y. State Barge Canal, De Graaf Bldg., Albany, N. Y.		Oct. 1, 1902
Conkling, Leon De Vere. City Engr., City Hall (Res., 613 W. Water St.), Elmira, N. Y.		Dec. 4, 1901

ASSOCIATE MEMBERS C

		Date of Membership.
Connick, Harris DeHaven. Asst. Engr., Dept. of Public Works, San Francisco, Cal.	Jun. Assoc. M.	Jan. 3, 1899 Feb. 4, 1903
Connor, William Durward. Lieut., Corps of Engrs., U. S. A., Instr. of Eng., U. S. M. A., West Point, N. Y.		Jan. 7, 1903
Constant, Frank Henry. Prof. of Structural Eng., Univ. of Minnesota, Minneapolis, Minn.		Dec. 2, 1896
Converse, William Hasson. Pres., Converse Bridge Co., Chattanooga, Tenn.		Jan. 5, 1892
Cook, John Henry. Hydr. Engr., Society for Establishing Useful Manufactures, 158 Ellison St., Paterson, N. J.		May 4, 1898
Coombs, Robert Duncan, Jr. 36 Lynwood Pl, New Haven, Conn.	Jun. Assoc. M.	May 2, 1899 Feb. 7, 1900
Corby, Charles Edward. In Chg. of Drafting Room, Met. St. Ry. Co., 822 Putnam Ave., Brooklyn, N. Y.		Oct. 4, 1893
Cornell, Douglas. Structural Engr., Bureau of Bldg., 1 Municipal Bldg., Buffalo, N. Y.		Sept. 6, 1899
Corner, Charles. Dist. Engr., Rhodesia Rys., Gwelo, Rhodesia, South Africa		May 1, 1895
Corning, Dudley Tibbits. M. E. & S. Dept., Cambria Steel Co., Johnstown, Pa.		Oct. 1, 1902
Corti, Joseph James. Casilla Correa 68, Mendoza, Argentine Republic		Jan. 1, 1896
Cory, Harry Thomas. Section Foreman, S. P. Co., Truckee, Cal	Jun. Assoc. M.	June 20, 1893 Mar. 7, 1900
Cosmus, John Albert. Special Agt., Continental Fire Ins. Co., P. O. Box 187, Utica, N. Y.		June 3, 1896
Coverdale, William Hugh. Pres., W. H. Coverdale & Co., Inc., 66 Broadway, Room 1516, New York City.	Jun. Assoc. M.	Jan. 2, 1894 Oct. 3, 1900
Cowper, John Whitfield. Mgr., James Stewart & Co., Savoy Hotel, London, W. C., England.	Jun. Assoc. M.	June 21, 1894 Oct. 2, 1901
Cox, Leonard Martin. Civ. Engr., U. S. N., Superv. Engr., Steel Floating Dock for Cavite, P. I., Sparrows Point, Md.		Oct. 4, 1899
Craig, Washington Righter. Res. Engr., Pitts., Shawmut & Northern R. R. Co., Angelica, N. Y.	Jun. Assoc. M.	May 1, 1894 Oct. 1, 1902
Crane, Clarence Austin. Civ. Engr. and City Surv., 765 Tremont Ave., Borough of the Bronx, New York City.		Mar. 5, 1902
Cresson, Benjamin Franklin, Jr. Engr. of Alignment, North River Div., P., N. Y. & L. I. R. R., 227 West 33d St., New York City.		April 2, 1902
Cresswell, Herbert Augustine. Res. Engr., Western Australian Govt. Rys., Geraldton, Western Australia.		Oct. 7, 1903
Crew, Charles Corwin. Res. Engr., St. L., K. C. & C. Ry. (Rock Island System), Versailles, Mo.		April 1, 1903
Cuddeback, Allan Winter. Engr. and Supt., Passaic Water Co., Paterson, N. J.		April 5, 1899
Cudworth, Frank Grant. Asst. Engr., Ford, Bacon & Davis, Engrs., 1500 Grand Ave., Kansas City, Mo.		Jan. 3, 1900
Cummings, Elmore David. 918 East 20th St., Baltimore, Md.		Nov. 4, 1903

		Date of Membership.
Cummings, Noah. Asst. Engr., Dept. of Bridges, 213 West 136th Street, New York City	Jun. Assoc. M.	Mar. 3, 1896 Jan. 6, 1904
Cunningham, John Miller. Mgr., West Pittsburgh Cement Mfg. Co., West Pittsburg, Pa		Oct. 7, 1903
Cunningham, Joseph Hooker. Chamber of Commerce Bldg., Portland, Ore		Sept. 6, 1899
Dalrymple, Francis Wharton. City Engr., Jamestown, N. Y		Feb. 7, 1894
Dana, Richard Turner. Civ. and Cons. Engr., 15 William St., New York City	Jun. Assoc. M.	Sept. 11, 1900 Feb. 4, 1903
Davis, Arthur Lincoln. Asst. to Pres., Am. Bridge Co. of N. Y., 100 Broadway, New York City	Jun. Assoc. M.	April 4, 1893 Oct. 7, 1896
Davis, Carleton Emerson. Res. Engr., Cedar Grove Reservoir, Dept. of Water, Newark, N. J		April 6, 1898
Davis, Fred Rufus. Res. Engr., Elder's Ridge Branch, Buffalo, Rochester & Pitts. Ry. Co., Parkwood, Pa		Nov. 5, 1902
Davis, Harold. 1457 Staughton St., N. W., Washington, D. C		Oct. 2, 1901
Davis, Leonard Henry. Chf. Engr., The Michigan Lake Superior Power Co., The Lake Superior Power Co., Sault Ste. Marie, Ont., Canada		Nov. 5, 1902
Davis, William Russell. Chf. Bridge Designer and Insp., Office of State Engr. and Surv. of New York, State Hall, Albany, N. Y.		May 2, 1900
Day, Edward Bliss. Office Engr., Burlington's Mo. Lines, Room 610, Globe Democrat Bldg., St. Louis, Mo		Feb. 4, 1903
Deans, Charles Herbert. 130 Water St., New York City.	Jun. Assoc. M.	Dec. 3, 1890 May 6, 1896
Derleth, Charles, Jr. Assoc. Prof., Structural Eng., Univ. of California, Berkeley, Cal	Jun. Assoc. M.	Feb. 1, 1898 Mar. 5, 1902
Despard, Duncan Lee. 2125 Delancey St., Philadelphia, Pa		Feb. 3, 1897
de Vou, James Laird. Care, Am. Bridge Co., Erecting Dept., 51st and Butler Sts., Pittsburg, Pa		April 1, 1903
De Witt, Elmore. Civ. Engr. for The Pennsylvania Steel Co. (Res., 348 Spruce St.), Steelton, Pa		Oct. 5, 1898
Diehr, Alvah Benjamin. U. S. Insp., Harbor Impvts., Box 2146, San Pedro, Cal		Nov. 5, 1902
Dillon, Francis Henry. Civ. Engr. and Contr. (Mackin & Dillon), Apartado 221, Monterey, Nuevo Leon, Mexico		Oct. 3, 1900
Dimon, Daniel Young. With Milliken Bros., 11 Broadway, New York City (Res., 189 Jefferson Ave., Brooklyn, N. Y)		Oct. 2, 1901
Dingle, James Hervey. City Surv., Charleston, S. C.	Jun. Assoc. M.	April 30, 1895 Oct. 4, 1899
Doebler, Valentine Sherman. Supt., Transportation Cam. Steel Co., Johnstown, Pa		Dec. 6, 1893
Doerfling, Richard George. 212 Seventh St., Portland, Ore		June 3, 1903
Donham, Benjamin Curtis. Chf. Engr., Collbran & Bostwick, Ry. and Gen. Contrs., Seoul, Corea		Jan. 2, 1901

		Date of Membership.
Dorrance, William Tully. Asst. Engr., Westinghouse, Church, Kerr & Co , 10 Bridge St., New York City		Sept. 4, 1901
Downes, Alfred Kimball. 71 Broadway, New York City		Feb. 3, 1904
Downman, Julian Romney. Mfr., Louisiana Red Cypress, 501 Hennen Bldg., New Orleans, La		Dec. 4, 1901
Drake, Robert Morris. Asst. Res. Engr., M. of W. Dept., S. P. Co., 3d and Townsend St. Depot, San Francisco, Cal		Mar. 7, 1900
Drew, Charles Davis. Asst. Engr., The Rapid Transit Subway Constr. Co., 350 Fulton St. (Res., 104 Columbia Hts.), Brooklyn, N. Y.		Oct. 7, 1903
Du Bois, Julian. Div. Supt., Fonda, Johnstown & Gloversville R. R., Amsterdam, N. Y		Jan. 8, 1902
Dufour, Frank Oliver. Acting Prof. of Bridge Eng., Univ. of Wisconsin (Engr. Bldg.), Madison, Wis.	Jun. Assoc. M.	Dec. 5, 1899 Oct. 1, 1902
Dunn, Emmett Clarke. City Engr., Alexandria, Va		Nov. 4, 1891
Eastwood, John Thompson. First Asst. Engr., Sewerage, Sewerage and Water Board, 602 Carondelet St., New Orleans, La	Jun. Assoc. M.	Mar. 6, 1894 Feb. 1, 1899
Eavenson, Howard Nicholas. Chf. Engr., United States Coal & Coke Co., Tug River, McDowell Co., W. Va		Mar. 6, 1901
Eddy, Harrison Prescott. Supt. of Sewers (Res., 11 Dean St.), Worcester, Mass		May 7, 1902
Eder, Henry James. Palmira, Cauca, Colombia	Jun. Assoc. M.	June 5, 1894 Sept. 1, 1897
Edwards, Frederick. Asst. Prof. of Civ. Eng., Union Coll., 813 Union St., Schenectady, N. Y	Jun. Assoc. M.	Jan. 31, 1899 Feb. 5, 1902
Edwards, Warrick Rigeley. Asst. to Engr., Bridges and Bldgs., B. & O. R. R., 1039 Calvert Bldg., Baltimore, Md		April 4, 1900
Ehle, Boyd. Res. Engr., Susquehanna Power Scheme, McCalls Ferry, York Co., Pa		Jan. 3, 1894
Eld, Charles John, Jr. Care, City Water Co., East St. Louis, Ill.		May 6, 1903
Elliott, James Rutherford. Civ. and Min. Engr. (Elliott & Baton), 1311 Keystone Bldg., Pittsburg, Pa		Sept. 4, 1901
Elliott, John Stuart. Civ. and Min. Engr., 59 Pine St., New York City		April 6, 1892
Endemann, Herman Karl. Asst. Engr., Topographical Bureau, Borough of Queens, 46 Herriman Ave., Jamaica, N. Y		Mar. 6, 1901
Engström, Frans. Engr. of Inspection, James Stewart & Co. (Res., 3721 Bouquet St.), Pittsburg, Pa		May 4, 1892
Evans, John Maurice. Chf. Insp. Erection, Williamsburgh Bridge, 84 Broadway (Res., 162 Wilson St.), Brooklyn, N. Y	Jun. Assoc. M.	May 4, 1897 Jan. 3, 1900
Evans, Myron Edward. Archt. and Engr. (Ballantyne & Evans), 22 Pine St., New York City	Jun. Assoc. M.	Jan. 3, 1895 Feb. 7, 1900
Evans, Peter Platter. Contr. Engr., The Osborn Eng. Co., Cleveland, Ohio	Jun. Assoc. M.	Feb. 6, 1894 Mar. 7, 1900
Fain, James Rhea. Norfolk, Nebr		June 4, 1902

		Date of Membership.
Fairchild, John Fletcher. Engineering Bldg., Mt. Vernon, N. Y.	Jun. Assoc. M.	April 5, 1892 Dec. 4, 1895
Farley, Philip Patrick. Asst. Engr., N. Y. Rapid Transit Comm., 13 Astor Pl., New York City (Res., 329 Macon St., Brooklyn, N. Y.).	Jun. Assoc. M.	Oct. 31, 1893 Mar. 6, 1901
Farquhar, Henry Stilson. Room 34, Manufacturers Record Bldg., Baltimore, Md.	Jun. Assoc. M.	April 5, 1892 Nov. 4, 1896
Fay, Edward Bayrd. (Brenneke & Fay, Cons. Civ. Engrs.), 1009 Fullerton Bldg., St. Louis, Mo.		Jan. 8, 1902
N. **Fenkell, George Harrison.** Civ. Engr. to Commrs. of Water-Works (Res., 1062 W. 8th St.), Erie, Pa.	Jun. Assoc. M.	Jan. 3, 1899 Oct. 1, 1902
Ferguson, John Neil. Asst. Engr., Charles River Basin Comm., 367 Boylston St., Boston, Mass.		Oct. 2, 1901
Ferguson, William Hastings. Supt. of Constr., Illinois Steel Co., 5845 Madison Ave., Chicago, Ill.		Jan. 7, 1903
Ferris, Frederick Edward. Surv., Eng. Bureau, Room 21, City Hall, Jersey City, N. J.		June 1, 1898
Fetherston, John Turney. Asst. Engr., Office of the Commr. of Public Works, Richmond Bldg., New Brighton, N. Y.		June 3, 1903
Fickes, Edwin Stanton. Chf. Engr. and Purchasing Agt., Pittsburg Reduction Co., Pittsburg, Pa.	Jun. Assoc. M.	Jan. 4, 1898 Feb. 6, 1901
Field, Frederick Elbert. Asst. Engr. with Chapin & Knowles, Civ. and Cons. Engrs., 1017 Frick Bldg., Pittsburg, Pa.		Oct. 7, 1903
Fish, John Charles Lounsbury. Assoc. Prof., Civ. Eng., L. S. Jr. Univ.; Pres., Board of Health of P. A., P. O. Box 20, Palo Alto, Cal.	Jun. Assoc. M.	Jan. 31, 1893 Feb. 7, 1900
FitzGerald, Christopher Columbus. Roadmaster, Chatta. Div., C., N. O. & T. P. Ry. Co., Somerset, Ky.		Oct. 2, 1901
Flinn, Alfred Douglas. Managing Editor, *The Engineering Record*, 114 Liberty St., New York City.		Dec. 6, 1899
Flynn, John, Jr. Civ. and Elec. Engr.; City Engr., 83 Third St., Troy, N. Y.		Jan. 8, 1902
Focht, Louis. Engr. to the State Board of Assessors, N. J., Trenton, N. J.		May 4, 1892
Ford, Frederick Luther. City Engr., Hartford, Conn.		Oct. 1, 1902
Ford, Robert Henry Persse. Asst. Engr., Cent. Vt. Ry., St. Albans, Vt.	Jun. Assoc. M.	Mar. 2, 1897 June 7, 1899
Ford, William Hayden. 506 Hale Bldg., Philadelphia, Pa.	Jun. Assoc. M.	Nov. 5, 1895 June 3, 1903
Fort, Edwin John. Dept. of Highways, Municipal Bldg., Brooklyn, N. Y.		April 1, 1896
Fortin, Sifroy Joseph. Representing Milliken Bros., Apartado 2019, City of Mexico, Mexico.		Nov. 6, 1895
Foster, Thomas J. Vice-Pres. and Mgr., National Bridge Supply Co., 116 Nassau St., New York City.		Feb. 1, 1899
Fox, Walter Gordon. N. Y. C. & H. R. R. R., Room 700, Grand Central Station, New York City.		Jan. 2, 1901

		Date of Membership.
Foyé, Andrew Ernest. Treas., Ryan-Parker Constr. Co., 21 Park Row, New York City	Jun. Assoc. M.	May 2, 1893 Nov. 4, 1896
Francis, Walter Joseph. Engr. of Hydr. Locks, Trent Canal, Peterborough, Ont., Canada.		May 1, 1901
Franklin, Benjamin. Civ. and Cons. Engr. (Franklin & Clarke), 907 Crozer Bldg., Philadelphia, Pa.		April 1, 1903
Fraser, Charles Edward. 684 St. Nicholas Ave., New York City	Jun. Assoc. M.	June 4, 1901 Sept. 2, 1903
Frazee, John Hatfield. 516 West 183d St., New York City		Dec. 6, 1899
Frazier, James Welch. Care, Brown Hoisting Machinery Co., Cleveland, Ohio		May 6, 1903
Freitag, Joseph Kendall. New England Agt., Hecla Iron Works, 166 Devonshire St., Boston, Mass.		Jan. 3, 1900
French, Arthur Willard. Prof. of Civ. Eng., Worcester Polytechnic Inst., Worcester, Mass.		April 4, 1900
French, Frank Chauncey. Acting Asst. Prof., Civ. Eng., Iowa State Coll., Ames, Iowa		Dec. 3, 1902
Frew, Robert Dickson Alison. Chelmer, near Brisbane, Queensland, Australia		June 1, 1898
Frick, Walter. Lewisburg, Union Co., Pa.		Dec. 2, 1896
Frink, Fred Goodrich. 1218 Washtenaw Ave., Ann Arbor, Mich.		May 3, 1899
Frost, George Sherman. Asst. Engr., Rapid Transit R. R. Comm., 1947 Broadway, New York City	Jun. Assoc. M.	April 2, 1901 Jan. 7, 1903
Fuller, Andrew Daniel. Cons. and Contr. Engr., 3 Hamilton Pl., Boston, Mass.	Jun. Assoc. M.	Dec. 6, 1898 Jan. 6, 1904
Fuller, Carl Hamilton. L. Schreiber & Sons Co. (Res., 3606 Bevis Ave., Station H), Cincinnati, Ohio.	Jun. Assoc. M.	Mar. 5, 1901 Feb. 3, 1904
R. Fuller, George Warren. (Rudolph Hering & George W. Fuller, Hydr. and San. Engrs.), 170 Broadway, New York City		Mar. 1, 1899
Gardiner, Frederick William. Prin. Asst. Engr., Manhattan Ry. Div., Interborough Rapid Transit Co., 32 Park Pl., New York City		Dec. 6, 1899
Garrett, John Thomas. Pres., Missouri Bridge & Iron Co., 715 Locust St., St. Louis, Mo.		May 1, 1901
Garrett, Robert Peel. Asst. Sewer Commr., Room 311, New City Hall, St. Louis, Mo.	Jun. Assoc. M.	Jan. 4, 1898 Oct. 2, 1901
Garrison, Frank Lynwood. Chf. Engr., Empire Lumber & Min. Co., Crandull, Johnson Co., Tenn		Sept. 7, 1892
Gartensteig, Charles. Asst. Engr., Bureau of Highways, Borough of the Bronx, 177th St. and Third Ave. (Res., 12 East 87th St.), New York City	Jun. Assoc. M.	Oct. 6, 1896 May 6, 1903
Gessner, Gustavus Adolphus, Jr. Asst. Engr., Riggs & Sherman, Civ. and Cons. Engrs., 613 The Nasby, Toledo, Ohio		April 2, 1902
Gideon, Abraham. Care, Philippine Civ. Service Board, Manila, Philippine Islands		Sept. 3, 1902
Gifford, Lester Robinson. Office of Structural Engr., Cambria Steel Co., Johnstown, Pa.	Jun. Assoc. M.	Mar. 3, 1896 Dec. 3, 1902

		Date of Membership.
GIFFORD, ROBERT LADD. Pres., Ill. Eng. Co., Cons. Engrs., 319 Manhattan Bldg., Chicago, Ill.		May 6, 1903
GILKEY, THOMAS ALVIN. With Pennsylvania Eng. Works, New Castle, Pa.		Oct. 3, 1900
GILLESPIE, RICHARD HENWOOD. Asst. Engr., Bureau of Highways, Bronx (Res., 2768 Bainbridge Ave.), New York City		Oct. 3, 1900
GLAZIER, WILLIAM LEONARD. Engr. and Supt., Newport Water-Works, Newport, Ky		Oct. 7, 1903
GODDARD, LESLIE WARREN. U. S. Asst. Engr., Grand Rapids, Mich.		Mar. 2, 1892
GOLDSMITH, NATHANIEL OLIVER. Chf. Engr., The Weir Frog Co.; Secy. and Treas., Am. Coke Drawer Co., Cincinnati, Ohio	Jun. Assoc. M.	June 2, 1886 June 6, 1900
GOWEN, SUMNER. Asst. Engr., Phœnix Bridge Co., Phœnixville, Pa.	Jun. Assoc. M.	May 2, 1899 June 4, 1902
GRANBERY, JULIAN HASTINGS. 561 Walnut St., Elizabeth, N. J.	Jun. Assoc. M.	Sept. 6, 1898 Sept. 2, 1903
GRANDY, ALBION LORENZO. Supervisor, Erie R. R. Co.; Address, 217 Spicer St., Akron, Ohio		April 4, 1900
GRANT, THOMAS HENRY. Red Bank, N. J.		May 6, 1891
GRAVELLE, ALVIN. Estimating Dept., Am. Bridge Co., Van Buren and Clark Sts., Chicago, Ill.		Nov. 6, 1901
GRAY, EDWARD, Jr. City Hall, Richmond, Va.		Jan. 2, 1895
GRAY, WILLIAM. Asst. Engr., Bureau of Sewers, Borough of Bronx, New York City	Jun. Assoc. M.	May 2, 1888 Mar. 1, 1893
GREEN, ANDREW H. 403 La Salle Ave., Chicago, Ill.		Oct. 2, 1901
GREEN, CHARLES NEWTON. Asst. Engr., Rapid Transit Comm., 1947 Broadway, New York City		June 3, 1903
GREEN, RUTGER BLEECKER. Civ. Engr., The Solvay Process Co., Detroit, Mich.	Jun. Assoc. M.	May 5, 1896 Oct. 5, 1898
GREENALCH, WALLACE. Deputy City Engr., Albany, N. Y.	Jun. Assoc. M.	April 3, 1894 June 7, 1899
GREENE, CARLETON. (Greene & Greene, Cons. Engrs.), 11 Broadway, New York City		Mar. 3, 1897
GREENE, FREDERICK STUART. Cons. Engr., The Am. Mfg. Co., 65 Wall St., New York City		June 7, 1899
GREENE, HOWARD ARNOLD. Div. Erecting Mgr., Am. Bridge Co., Pittsburg, Pa.		June 5, 1895
GREENE, ROBERT MAXSON. Structural Engr.'s Office, Cambria Steel Co., Johnstown, Pa.		June 1, 1898
GREGORY, CHARLES EMERSON. 2471 Davidson Ave., Bronx, New York City	Jun. Assoc. M.	Oct. 6, 1896 Mar. 6, 1901
GREGORY, JOHN HERBERT. Engr. of Designs, Dept. of Public Service, City Hall, Columbus, Ohio	Jun. Assoc. M.	Jan. 3, 1899 April 3, 1901
GRIFFITH, LAWRENCE. Engr. of M. of W., Grand Central Station and Harlem Line, Grand Central Station, New York City (Res., 7 Lincoln Terrace, Yonkers, N. Y.)		May 2, 1900
GRISWOLD, RAY ELLIOTT. Care, The Barber Asphalt Paving Co., Land Title Bldg., 19th Floor, Philadelphia, Pa.		Oct. 1, 1902

		Date of Membership.
Gross, Daniel Wingerd. Schenectady Ry. Co., Ballston, N. Y.		May 1, 1901
Gubelman, Frederick Joseph. Pres. and Mgr., Eastern Constr. Co. of N. J., 32 Nassau St., New York City		Oct. 2, 1895
Gudewill, Charles Edward. Vice-Pres., Montreal Pipe Foundry Co., P. O. Box 2304, Montreal, Que., Canada		Sept. 1, 1897
Gudmundsson, Gisli. 407 Fourth Ave, Room 205, Pittsburg, Pa.		Jan. 3, 1900
Gueringer, Louis Amedee. Div. Engr., Trinity & Brazos Val. Ry. Co., Hillsboro, Tex		May 7, 1902
Haas, Edward Francis. 321 Sansome St., San Francisco, Cal.	Jun. Assoc. M.	Feb. 6, 1894 Sept. 5, 1900
Hagar, Edward McKim. Mgr., Cement Dept., Ill. Steel Co., 1060 The Rookery, Chicago, Ill.		Feb. 6, 1901
Haight, Horace De Remer. Engr. for Thomas Prosser & Son, 15 Gold St., New York City; Address, 488 Western Ave., Albany, N. Y.	Jun. Assoc. M.	May 1, 1900 Feb. 4, 1903
Hain, James C. Engr., Masonry Constr., C., M. & St. P. Ry., 192 Fullerton Ave., Chicago, Ill.		May 1, 1901
Haines, Eugene Grove. Res. Engr., Atlantic Ave. Impvt., Div. No. 1, 5 Hanson Pl., Brooklyn, N. Y.		May 1, 1901
Hall, Charles Romney. U. S. Engr. Dept., Fort McKinley, Portland Harbor, Me.		Jan. 7, 1903
Hall, Louis Wells. U. S. Engr. Office, Tuscaloosa, Ala.		Oct. 1, 1902
Hallihan, John Philip. Res. Engr. and Supt., Rys., Cananea Cons. Copper Co., Cananea, Sonora, Mexico		April 4, 1900
Ham, William Hale. 156 Fifth Ave., New York City		Nov. 5, 1902
Hamlin, William Eliot. Chf. Engr., Frank B. Gilbreth, Gen. Contr., Park Row Bldg., New York City		Dec. 2, 1903
Hammatt, William Cushing. Engr., Mountain Copper Co., Iron Mountain, *via* Keswick, Shasta Co., Cal.		Sept. 5, 1900
Hankinson, Albert Worthington. 62 West 85th St., New York City.		Oct. 7, 1903
Hanna, John Hunter. Asst. Chf. Engr. and Supt., Capital Traction Co., 36th and M Sts., Washington, D. C.		April 3, 1901
C. Harby, Isaac. Civ. Engr. with John A. Roebling's Sons Co., Trenton, N. J.	Jun. Assoc. M.	June 6, 1899 May 6, 1903
Hardison, Allen Crosby. Civ. and Min. Engr., 406 Douglas Blk., Los Angeles, Cal.		Feb. 6, 1901
Hardy, Harry. 6 Sunderland Terrace, Bayswater, London, W., England		June 1, 1892
Harlow, James Hayward, Jr. Asst. Engr., Susquehanna Canal & Power Co., Conowingo, Cecil Co., Md.		Mar. 5, 1902
Harman, Jacob Anthony. Civ. and San. Engr., 109 S. Jefferson Ave., Peoria, Ill.		May 4, 1898
Harper, Austin Curtin. U. S. Asst. Engr., Care, Isthmian Canal Comm., Washington, D. C.		Jan. 7, 1903
Harper, Isaac Onward. Secy. and Treas., Lauer & Harper Co., Baltimore, Md.		May 7, 1902

		Date of Membership.
Harrington, Ferdinand Finney. Bridge Dept., N. Y. C. & H. R. R. R. Co., Grand Central Station, New York City		May 3, 1899
Harris, Van Alen. San Juan, Porto Rico	Jun. Assoc. M.	Nov. 6, 1894 Oct. 5, 1898
Harte, Charles Rufus. 34 Elm St., Jamaica Plain, Mass.	Jun. Assoc. M.	April 4, 1899 May 2, 1900
Hartigan, Frederick Lawrence. Engr. and Contr., 4920 Washington Ave., Chicago, Ill		May 6, 1903
Hartwell, Harry. Supt of Constr., J. G. White & Co., Ltd., 22a College Hill, Cannon St., London, E. C., England	Jun. Assoc. M.	Jan. 2, 1894 Feb. 2, 1898
Harwood, George Alec. Asst. Engr., N. Y. C. & H. R. R. R., Grand Central Station, New York City		Feb. 5, 1902
Hasskarl, Joseph Frederick. Supt. of Constr., U. S. Engr. Dept. (Res., 2504 North 5th St.), Philadelphia, Pa		Mar. 5, 1902
Hastings, Frank Arnold. Eng. Dept., Am. Bridge Co., Ambridge (Res., 67 S. Dithridge St., Pittsburg), Pa		Dec. 3, 1902
Hatt, William Kendrick. Prof. of Applied Mechanics, Purdue Univ., Lafayette, Ind		June 4, 1902
Hauck, William. Asst. Engr., Aqueduct Comm., Jerome Park Reservoir, New York City		June 5, 1901
Hawes, Louis Edwin. Civ. and Hydr. Engr., 101 Tremont St., Boston, Mass		Sept. 2, 1896
Hawley, George Prince. Fairmont, Martin Co., Minn		Feb. 6, 1901
Haycroft, James Isaac. Fontenoy, Ocean St., Woollahra, New South Wales, Australia		Jan. 3, 1894
Hayden, John Bruce. Bridge Dept., N. Y. C. & H. R. R. R., Room 500, Grand Central Station, New York City		May 2, 1900
Hayes, Morgan Dodge. Am. Water-Works & Guarantee Co., Bank for Savings Bldg., Pittsburg, Pa		April 1, 1903
Hayford, John Fillmore. Insp. of Geodetic Work and Chf. of Computing Div., Coast and Geodetic Survey, Washington, D. C		May 6, 1896
Hays, Don. Chf. Draftsman, C., R. I. & P. R. R. Constr. Office, Care, E. J. Beard, 410 Kansas City Life Bldg., Kansas City, Mo.		May 6, 1903
Hazard, Erskine. Box 3197, Johannesburg, Transvaal, South Africa		Oct. 2, 1895
Hazen, William Nelson. (Frink & Hazen, Cons. and Contr. Engrs.), 711 Union Trust Bldg., Baltimore, Md		Dec. 3, 1902
Hazlett, Robert. City Bank Bldg., Wheeling, W. Va		Mar. 4, 1896
Heindle, William Albert. Asst. Engr., J. G. White & Co., Ltd., 22a College Hill, Cannon St., London, E. C., England		Nov. 6, 1901
Helm, Edwin Guy. City Engr., East St. Louis, Ill		Dec. 5, 1900
Hemming, Dunkin Wirgman. 502 West 143d St., New York City		Sept. 7, 1892
Henderson, John Thomas. Asst. Engr., Conn. River Bridge and Highway Dist., 650 Main St., Hartford, Conn		Sept. 3, 1902
Hendricks, Victor King. Asst. to Engr., M. of W., B. & O. R. R. Co., 111 W. Saratoga St., Baltimore, Md		May 1, 1895

		Date of Membership.
Hengst, Robert Graham. Asst. Chf. Engr., West. Allegheny R. R. Co., 301 Smithfield St., Pittsburg, Pa.		Oct. 7, 1903
Henry, Francis Maxwell. Lumber Exchange, Minneapolis, Minn.		Mar. 4, 1896
Henry, Philip Walter. Vice-Pres., Medina Quarry Co., 150 Nassau St., New York City		Jan. 3, 1894
Herrick, John James. 161 Franklin Pl., Flushing, N. Y.		June 6, 1900
Herring, Willard E. Div. Engr., M., K. & T. R. R., Shawnee, Okla.		Sept. 4, 1901
Highley, Lee. B. and B. Dept., Mo. Pac. Ry., Pacific, Mo.	Jun. Assoc. M.	Dec. 7, 1897 Dec. 4, 1901
Hill, Curtis. First Asst. Civ. Engr., Sewer Dept., City Hall, St. Louis, Mo.		Oct. 2, 1901
Hill, Edwin Allston. Asst. Examiner, Classification Div., U. S. Patent Office, Washington, D. C.		May 3, 1893
Hill, John Edward. Prof. of Civ. Eng., Brown Univ., Providence, R. I.		May 4, 1892
Hill, Theodore William. Supt. of Masonry, F. H. Clement & Co., Contrs., Newton Falls, Ohio		Mar. 7, 1900
Hill, Walter Arthur. Res. Engr., Mex. National R. R., Saltillo, Coahuila, Mexico		Sept. 2, 1896
Hilliard, Foster Haven. Asst. Engr., Louisiana Purchase Exposition Co., Care, Eng. Dept., World's Fair, St. Louis, Mo.		Mar. 6, 1901
Hirst, Arthur. Asst. Engr., Eng. Dept., Am. Bridge Co., Pencoyd, Pa.		Dec. 3, 1902
Hite-Smith, Van Dusen. Cons. Engr., Knoxville, Tenn.		April 3, 1901
Hobby, Arthur Stanley. Gen. Mgr., Guantanamo R. R., Guantanamo, Cuba		Sept. 4, 1901
Hoffmann, Robert. Asst. Engr., Dept., Public Service, in Chg. of Sewers and Drains, P. O. Box 180, Cleveland, Ohio		June 5, 1901
Hogue, Charles Jay. Watsontown, Pa.		Dec. 7, 1898
Holbrook, Percy. 145 West 69th St., New York City		Mar. 2, 1898
Holmes, Glenn Dickinson. Chf. Engr., Oak Orchard Drainage Comm., Batavia, N. Y.		June 5, 1901
Homan, William MacLean. 13 Mutual Bldgs., Durban, Natal, South Africa		June 7, 1899
Hone, Frederic de Peyster. (Chambers & Hone), 60 New St., New York City	Jun. Assoc. M.	April 4, 1899 Feb. 5, 1902
Honens, Frederick William. U. S. Junior Engr., U. S. Engr. Office, Sterling, Ill.		April 3, 1901
Honness, George Gill. Div. Engr., Jersey City Water Supply Co., Boonton, N. J.	Jun. Assoc. M.	Feb. 2, 1897 Sept. 4, 1901
Hopkins, Albert Lloyd. Asst. to Gen. Supt., Newport News Shipbuilding & Dry Dock Co., Newport News, Va.	Jun. Assoc. M.	April 3, 1894 April 3, 1901
Horton, Theodore. Prin. Asst. Engr. with Hering & Fuller, 170 Broadway, New York City	Jun. Assoc. M.	Aug. 31, 1897 April 4, 1900
Houston, Gavin Nelson. Asst. Engr. in State Engr.'s Office, Denver; Address, University Park, Colo.	Jun. Assoc. M.	May 4, 1897 Nov. 7, 1900
Howard, Charles Pope. Asst. Chf. Engr., Deepwater Ry., Beckley, W. Va.		Jan. 3, 1894

		Date of Membership.
Howe, George Edward. 41 Vinal Ave., Somerville, Mass		Mar. 4, 1903
Howe, Joseph Milton. 914½ Franklin Ave., Houston, Tex.		Feb. 4, 1903
Hoyt, John T Noye. Structural Engr., Green & Wicks, Buffalo, N. Y	Jun.	Feb. 28, 1893
	Assoc. M.	Mar. 2, 1898
Hubbard, Winfred Dean. Supt. of Water-Works and Sewers, Concord, Mass		Nov. 5, 1902
Huestis, Charles Calvin. Gen. Mgr., The T. H. Riddle Constr. Co., Ravenna, Ohio		Mar. 6, 1901
Hughes, Francis Dey. Engr. and Mgr., Southwestern Bridge & Iron Co., Box 357, Enid, Okla		Sept. 3, 1902
Humphrey, Henry Cyprian. Provincial Superv., Lucena, Tayabas Province, Philippine Islands		Sept. 4, 1901
Humphrey, Richard Lewis. Cons. Engr., 1001 Harrison Bldg., Philadelphia, Pa		May 5, 1897
Humphreys, Clifton Stewart. Mill Archt. and Engr. (Snow & Humphreys), 85 Water St., Boston, Mass. (also Madison, Me.)		May 2, 1900
Hunt, Loren Edward. Expert in Timber Testing, U. S. Bureau of Forestry; Address, Univ. of California, Berkeley, Cal		June 3, 1903
Hunter, Robert Easton. 644 St. Denis St., Montreal, Que., Canada.		Nov. 6, 1901
Huston, Tillinghast L'Hommedieu. Gen. Contr., 36 Obispo, Havana, Cuba		May 2, 1900
Hutchinson, Cary Talcott. Cons. Elec. Engr., 56 Pine St., New York City		Mar. 4, 1896
Hyde, Charles Gilman. Asst. Engr. in Chg. of Filters (Investigations, Design and Constr. of Works), Board of Public Works (Res., 2114 North Third St.), Harrisburg, Pa		April 2, 1902
Hyde, William Herbert. Rillton, Westmoreland Co., Pa	Jun.	April 30, 1901
	Assoc. M.	June 4, 1902
Ilsley, Arthur Benjamin. Asst. Bridge Engr., B. & M. R. R., Boston, Mass	Jun.	Feb. 28, 1899
	Assoc. M.	Mar. 4, 1903
Ingram, Edward Lovering. Expert Aid (Civ. Engr.), Dept. of Yards and Docks, New York Navy Yard, Brooklyn, N. Y		Sept. 4, 1895
Jackson, James Madison. Pres. and Gen. Mgr., Everglade Cypress Lumber Co., Parkersburg, W. Va		Jan. 2, 1901
Jackson, John Franklin. Contr. Engr., Wisconsin Bridge & Iron Co., Houghton, Mich		May 2, 1894
Jacobs, Joseph. Chf. Draftsman, Gen. Offices, S. P. Co., San Francisco, Cal		Sept. 4, 1901
Janney, Thomas Gordon. Gen. Mgr., Centerville Dredging Co., Centerville, Idaho		Oct. 3, 1900
Janvrin, Ned Herbert. Res. Engr., Am. Bridge Co. of N. Y., 1037 Fourth St., Louisville, Ky	Jun.	Oct. 5, 1897
	Assoc. M.	June 5, 1901
Jarrett, Edwin Seton. Of Foundation & Contr. Co., 35 Nassau St., New York City		May 1, 1895
Jaudon, Henry Scudder. Asst. Supt., Birmingham Water-Works Co., Birmingham, Ala		Feb. 4, 1903

		Date of Membership.
Jenckes, Lawrence Bates. Stamford, Conn.	Jun. Assoc. M.	Mar. 31, 1891 Oct. 7, 1896
Johnson, Alexander. Asst. Engr., Dept. of Bridges, 13 Park Row, New York City		Sept. 5, 1900
Johnson, Arthur Newhall. Highway Engr., Maryland Geological Survey, Baltimore, Md.		Sept. 2, 1903
Johnson, Lewis Jerome. Asst. Prof. of Civ. Eng., Harvard Univ., 309 Pierce Hall, Cambridge, Mass.		Sept. 4, 1901
Johnson, Rankin. Asst. Chf. Engr., Mex. International R. R., Durango, Durango, Mexico		Feb. 7, 1900
Johnson, William Edward. Chf. Engr. for Hartford Water Comm., P. O. Box 37, West Hartford, Conn.		April 3, 1901
Johnson, William Stone. Asst. Engr., Mass. State Board of Health, Room 140, State House, Boston, Mass.		June 6, 1894
Jones, Henry Llewellyn. Res. Engr., U. S. Steel Products Export Co., Sydney, New South Wales, Australia		Oct. 5, 1898
Jonson, Ernst Fredrik. Care, Lewinson & Co., 128 West 42d St., New York City		Jan. 3, 1900
Jordan, William Frederick. Res. Engr., E. Div., N. Y. C. & H. R. R. R., Grand Central Station, New York City		April 1, 1891
C. Kahn, Julius. Cons. Engr.; Pres. and Mgr., Trussed Concrete Steel Co., Union Trust Bldg., Detroit, Mich.	Jun. Assoc. M.	May 3, 1898 Oct. 3, 1900
Keays, Reginald Horton. Asst. Supt., Hudson Impvt. Co., Foot of Morton St., New York City	Jun. Assoc. M.	June 6, 1899 April 3, 1901
Keller, Charles Lincoln. First Asst. Engr., The Scherzer Rolling Lift Bridge Co., 1616 Monadnock Blk., Chicago, Ill.	Jun. Assoc. M.	Oct. 4, 1898 Mar. 6, 1901
Kelley, James Augustus. Engr. for T. H. Clement & Co., Contrs., Land Title Bldg., Philadelphia, Pa.	Assoc. Assoc. M,	Mar. 5, 1901 Sept. 2, 1903
Kellogg, Albert Victor. Engr., M. of W., Houston & Tex. Cent. R. R. Co., Houston East & West Ry. Co. and Houston & Shreveport R. R. Co., Houston, Tex.		Nov. 6, 1895
Kelly, William. 1st Lieut., Corps. of Engrs., U. S. A., U. S. Engr. Office, New London, Conn.		Feb. 3, 1904
Kenney, Edward Fulbister. Engr. of Tests, P. R. R., Broad St. Station, Philadelphia, Pa.	Jun. Assoc. M.	Nov. 3, 1896 May 3, 1899
Kenyon, George Cecil. Engr.'s Dept., Mersey Docks and Harbor Board (Private address, "Beau Coin," West Derby), Liverpool, England		April 4, 1900
Ketchum, Milo Smith. Contr. Mgr., Am. Bridge Co., 704 Postal Telegraph Bldg., Kansas City, Mo.		Sept. 4, 1901
Kimball, William Hale. 69 McManus Bldg., Davenport, Iowa		April 1, 1903
Kinsey, Frank Wilmarth. P. O. Box 3581, Boston, Mass.	Jun. Assoc. M.	Feb. 2, 1892 Dec. 7, 1898
Knap, Edgar Day. Asst. Engr., Dept. of Bridges, Foot of Delancey St., East River, New York City	Jun. Assoc. M.	Dec. 1, 1896 Dec. 4, 1900

		Date of Membership.
Knapp, Hermann Meriwether. Contr. Mgr., Am. Bridge Co. of N. Y., Union Trust Bldg., Cincinnati, Ohio		May 6, 1903
Knight, Frank Barr. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City		Sept. 4, 1901
Knoch, Julius James. Prof. of Civ. Eng., Univ. of Arkansas, Fayetteville, Ark.		Oct. 2, 1901
Knowlton, Theodore Ely. Civ. Engr. and Contr., Denver, Colo.	Assoc. Assoc. M.	Mar. 31, 1896 May 7, 1902
Koenig, Arnold Charles. Civ. and Hydr. Engr. and Water Commr., 514 Bee Bldg., Omaha, Nebr.		Nov. 7, 1900
C. **Kummer, Frederic Arnold.** Treas. and Gen. Mgr., United States Wood Preserving Co., 29 Broadway, New York City	Jun. Assoc. M.	April 30, 1895 Mar. 4, 1903
Kyle, George Allan. Div. Engr., Grand Trunk Pacific Ry., Box 68, Winnipeg, Man., Canada		Feb. 2, 1892
Lambert, Wallace Corliss. Gleasondale, Mass.		April 4, 1900
Lane, Edwin Grant. Asst. Engr., Butler Div., B. & O. R. R., Butler, Pa.		Jan. 8, 1902
Lane, Frederick Eugene. Asst. Engr., Atlantic Ave. Impvt., L. I. R. R., 5 Hanson Pl. (Res., 1037 Bergen St.), Brooklyn, N. Y.		Oct. 1, 1902
Lathbury, Benjamin Brentnall. Pres., Alma Cement Co. (Lathbury & Spackman, Inc.), 1619 Filbert St., Philadelphia, Pa.		Mar. 3, 1897
Latta, Harrison Wainwright. Pres., Latta & Terry Co., Engrs. and Contrs., 801 Drexel Bldg., Philadelphia, Pa.		Sept. 5, 1900
Lavis, Fred. Care, Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City		Sept. 6, 1899
Law, Arthur Price. Bridgeport, Conn.		June 3, 1903
Lawlor, Thomas Francis. 220 Broadway, New York City.	Jun. Assoc. M.	June 5, 1889 May 2, 1894
Lawson, Thomas R. Asst. Prof. of Mechanics, Res. Poly. Inst., 99 Twelfth St., Troy, N. Y.		June 3, 1903
Lawton, Perry. 7 Savings Bank Bldg., Quincy, Mass.	Jun. Assoc. M.	Jan. 3, 1893 Sept. 2, 1896
Lawton, Walter Luman. Engr. and Contr., 132 Chestnut St., Albany, N. Y.		Mar. 5, 1902
Leavenworth, George Stevens. Chf. Engr., Powers & Mansfield Co., 280 River St., Troy, N. Y.		June 3, 1903
Leavitt, Charles Wellford, Jr. Civ. and Landscape Engr., 15 Cortlandt St., New York City		Jan. 4, 1898
Lee, David Read. Care, Water Commrs., Middletown, N. Y.		Oct. 7, 1896
Leeper, John Bigger. Asst. Engr., Am. Bridge Co., Ambridge, Pa.		Jan. 3, 1900
Leffingwell, Frank Dodge. Res. Engr., Rapid Transit Subway Constr. Co., Brooklyn Extension, 350 Fulton St., Brooklyn, N.Y.		Oct. 5, 1898
Lentilhon, Eugene. Contr. Engr., 489 Fifth Ave., New York City	Jun. Assoc. M.	Mar. 1, 1891 Mar. 6, 1895
Lepper, Fred William. Supt. of Constr., U. S. Custom House, Memphis, Tenn		Jan. 2, 1901

		Date of Membership.
LEWERENZ, ALFRED COURTNEY. Civ. Engr., U. S. N., in Chg. of Eng. Work, Navy Yard, Puget Sound, Wash.	Jun. Assoc. M.	Mar. 5, 1895 June 6, 1900
LEWIS, CLARENCE MCKENZIE. Care, Wm. Salomon & Co., 25 Broad St., New York City		Dec. 3, 1902
LEWIS, CLIFFORD, Jr. Contr. Engr., Second National Bank Bldg., Utica, N. Y.		Sept. 2, 1903
LILLY, GEORGE WASHINGTON. Asst. Engr., Board of Public Service, Columbus, Ohio		April 2, 1902
LINDSEY, JOHN BROWN, Jr. Supt., West Pascagoula Creosoting Works, Gautier, Miss		June 3, 1903
LION, LÉON ÉLIE. Junior Engr., U. S. Engrs., 1010 Burgundy St., New Orleans, La.	Jun. Assoc. M.	Feb. 1, 1898 April 4, 1900
LITTLE, GEORGE KERR. U. S. Junior Engr., Tuscaloosa, Ala		June 3, 1903
LIVERMORE, NORMAN BANKS. Civ. and Hydr. Engr., Rialto Bldg., San Francisco, Cal	Jun. Assoc. M.	Dec. 5, 1899 Oct. 1, 1902
LLEWELLYN, FREDERICK THOMAS. Vice-Pres. and Gen. Mgr., Monterey Foundry & Machine Wks., Apartado 63, Monterey, Mexico		Oct. 4, 1899
LOCKE, WILLIAM WILLARD. San. Insp., Met. Water and Sewerage Board, 5 Myrtle St., South Framingham, Mass.		Oct. 6, 1897
LOCKWOOD, WILLARD DATUS. Care, Frodingham Iron & Steel Co., Frodingham, Doncaster, England	Jun. Assoc. M.	April 3, 1894 Oct. 7, 1896
LONG, EUGENE MCLEAN. 220 Broadway, New York City		June 1, 1898
LOOK, MOSES JEROME. Div. Engr., Met. Water and Sewerage Board, 98 Walnut St., Clinton, Mass.		May 6, 1903
LOOKER, HENRY BRIGHAM. Surv. of the Dist. of Columbia, Surveyor's Office, Washington, D. C.		May 3, 1893
LOW, GEORGE EVARTS. 45 Broadway, New York City	Jun. Assoc. M.	Nov. 6, 1894 Mar. 2, 1898
LOWINSON, OSCAR. Cons. Archt. and Engr., 25 West 24th St., New York City	Jun. Assoc. M.	May 3, 1892 Feb. 7, 1900
LUDWIG, JULIUS ALFRED. 79 Wall St., New York City	Jun. Assoc. M.	May 31, 1892 Oct. 2, 1895
LUND, GEORGE ALFRED. Box 388, Cape Town, South Africa		Nov. 7, 1894
LYLE, WILLIAM THOMAS. Instr. in Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa		Nov. 6, 1901
LYNCH, TILLMAN DANIS. Engr. of Material Tests, Westinghouse Elec. & Mfg. Co., Pittsburg; Address, East Pittsburg, Pa		Nov. 3, 1897
LYON, WALLACE CHITTENDON. Asst. Structural Engr., Care, Superv. Archt.'s Office, Washington, D. C		Feb. 6, 1901
MACCREA, DON ALEXANDER. Loc. Engr., Midland Val. R. R., Fort Smith, Ark	Jun. Assoc. M.	May 2, 1899 Oct. 1, 1902
MACGREGOR, JOHN GRANT. Chf. Engr.'s Office, L. & N. R. R., Louisville, Ky		June 3, 1903
MACGREGOR, ROBERT ATHOLE. Asst. Engr., Bureau of Highways, Borough of the Bronx, Wendover and Third Avenues, New York City		Nov. 2, 1898

		Date of Membership.
MACNAB, GEORGE TRAVILLA. Asst. Engr., Highways, Borough of Bronx, 106 West 130th St., New York City		Feb. 3, 1897
MACNEILLE, PERRY ROBINSON. Cons. Engr., 230 Fourth Ave., W., Roselle, N. J.	Jun. Assoc. M.	April 5, 1898 June 5, 1901
MACY, ELBERT CLYDE. Asst. Engr., C. G. W. Ry., St. Paul, Minn.		Sept. 2, 1903
MCCAFFERY, RICHARD STANISLAUS. Cons. Min. Engr. and Metallurgist, Keith Bldg., Salt Lake City, Utah	Jun. Assoc. M.	May 4, 1897 Sept. 4, 1901
MCCAUSTLAND, ELMER JAMES. Asst. Prof. of Min. and Surveying, Cornell Univ., 105 Valentine Pl., Ithaca, N. Y.		Sept. 5, 1900
MCCLURE, JOHN CLARENDON. Asst. Engr., S. P. Co. (M. of W. Dept.), Arcade Depot, Los Angeles, Cal.		Feb. 6, 1895
MCCORMACK, EDGAR WALTER. Chf. Engr., Nipe Bay Syndicate, Mayari, Cuba		Mar. 6, 1901
MCCOY, CHARLES EPHRAIM. Morgantown, W. Va.		June 3, 1903
MCCREA, JAMES ALEXANDER. Supt., Cincinnati Div., Penn. Lines W. of Pitts., Cincinnati, Ohio	Jun. Assoc. M.	Nov. 1, 1898 Nov. 7, 1900
MCCULLOCH, RICHARD. Asst. Gen. Mgr., Chic. City Ry. Co., 2020 State St., Chicago, Ill		Mar. 2, 1898
MCDARGH, HARRY JOHN. Cons. Civ. and Hydr. Engr. (Folsom & McDargh), Fifth Floor, Conover Bldg., Dayton, Ohio		April 2, 1902
MCFETRIDGE, WILLIAM SUTTON. Asst. Chf. Engr., Little Kanawha R. R., Z., M. & P. R. R., P. B. & T. R. R., B. & E. R. R., B. & N. R. R., Parkersburg, W. Va.	Jun. Assoc. M.	May 3, 1898 Mar. 4, 1903
MCGEE, VAN NORMAN. Walker, Ariz.		June 6, 1900
MCGILVRAY, THOMAS FORRESTER. Cons. Engr., 209 First National Bank Bldg., Duluth, Minn		Feb. 5, 1902
MCGUIRE, JAMES CLARK. Cons. Engr. and Contr., 26 Cortlandt St., New York City	Jun. Assoc. M.	May 5, 1891 Jan. 5, 1898
MCKAY, GEORGE ALBERT. Civ. Engr., U. S. N., U. S. Naval Coal Depot, Narragansett Bay, Newport, R. I.		Feb. 4, 1903
MCKENNEY, CHARLES ALBERT. Asst. Engr., Municipal Bldg., Washington, D. C	Jun. Assoc. M.	Dec. 4, 1894 Dec. 1, 1897
MCKENZIE, THOMAS. Box 765, Westerly, R. I.	Jun. Assoc. M.	May 2, 1893 Nov. 6, 1895
MCKIBBEN, FRANK PAPE. Asst. Prof. of Civ. Eng., Mass. Inst. Tech., Boston, Mass.	Jun. Assoc. M.	Jan. 3, 1895 Mar. 6, 1901
MCMEEKIN, CHARLES WILLIAM. Vice-Pres. and Cons. Engr., Britannia Copper Syndicate, Ltd., Vancouver, B. C., Canada	Jun. Assoc. M.	April 2, 1890 Mar. 7, 1894
MCREYNOLDS, ORVAL OMAR. Civ. and Min. Engr. (Middleton & McReynolds), 709 Equitable Bldg., Denver, Colo.		Dec. 5, 1900
MAGOR, HENRY BASIL. Pres., Wonham-Magor Eng. Works, 29 Broadway, New York City	Jun. Assoc. M.	April 30, 1895 Mar. 7, 1900
MALUKOFF, ALEXIS JOSEPH. With Rapid Transit R. R. Comm., 320 Broadway (Res., 213 West 136th St.), New York City		Jan. 2, 1901
MANAHAN, ELMER GOVE. Engr. for Myles Tierney, Oradell, N. J.		Oct. 7, 1903
MANNING, ROLLO GLENROY. Engr., Toledo Plant, Am. Bridge Co., 1303 Utah St., Toledo, Ohio		Oct. 2, 1901

		Date of Membership.
Marden, Walter Reuben. Chf. Engr., The United Constr. Co., 467 Broadway, Albany, N. Y.		April 4, 1894
Marquand, Philip. Partner of Allen, Sand & Co., 7 Pine St., New York City		Oct. 5, 1898
Marston, Frank Leonard. Bangor, Me.		Oct. 2, 1901
Martin, James William. 432 Broadway, Pueblo, Colo.		Nov. 1, 1899
Mason, Francis. Care, Penn., N. Y. & L. I. R. R., 225 West 33d St., New York City	Jun. Assoc. M.	April 3, 1900 April 1, 1903
Mason, George Cotner. Asst. Prof. of Civ. Eng., New York Univ., University Heights, New York City	Jun. Assoc. M.	Mar. 6, 1894 May 3, 1899
Mathewson, Isaac. Santa Fé, Distrito de Alarcon, Guerrero, Mexico.		Mar. 7, 1894
Mattair, Lewis Henry. Civ. and San. Engr., Quartermaster Dept., U. S. A., Fort McPherson, Ga.		Oct. 1, 1902
Matthes, Francois Emile. U. S. Geological Survey, Washington, D. C.		April 3, 1901
Matthes, Gerard Hendrik. Engr., Reclamation Service, and Special Disbursing Agt., U. S. Geological Survey, Lawton, Okla.		June 6, 1900
Maximoff, Sergius Pavlovitch. Engr. to the Imperial Russian Govt.; Asst. at the Imperial Inst. of Public Ways at St. Petersburg, Zabalkanski pr. 67, St. Petersburg, Russia		April 1, 1903
Mayer, August. 810 Jordan St., Shreveport, La.		June 1, 1892
Meem, James Cowan. Chf. Engr., Cranford & McNamee, 215 Montague St. (Res., 177 Woodruff Ave.), Brooklyn, N. Y.		April 1, 1896
Merrill, Ogden. 78 South 10th St., Brooklyn, N. Y.		Feb. 3, 1904
Mesa, Antonio Esteban. Animas 100, Havana, Cuba		Jan. 1, 1896
Miles, John Wiley. Chf. Engr., F. C. Vera Cruz (Mex.), Ltd., 12 B. Juarez, Vera Cruz, Mexico		Oct. 2, 1901
Millard, Charles Sterling. Engr., M. of W., Peoria & Eastern Ry., Indianapolis, Ind.	Jun. Assoc. M.	May 2, 1899 June 5, 1901
Miller, Clifford Neville. Asst. in Chg. of Chf. Engr.'s Office, Commrs. of Water-Works (Res., 21 San Rafael Bldg.), Cincinnati, Ohio	Jun. Assoc. M.	June 4, 1891 Feb. 5, 1896
Miller, George Soter. Supt., Engr. Dept., Fort H. G. Wright, Fishers Island, N. Y.		April 1, 1903
Miller, Hew. 150 West 35th St., New York City		Mar. 3, 1897
Miller, Shrewsbury Beauregard. 261 Union St., Hackensack, N. J.		Jan. 4, 1893
Mills, John Charles. Care, Messrs. King, Hamilton & Co., Calcutta, India		Nov. 6, 1895
Moisseiff, Leon Solomon. Asst. to the Commr., Dept. of Bridges, 13 Park Row, New York City	Jun. Assoc. M.	Dec. 3, 1895 Sept. 5, 1900
Moler, William Griffith. Representative of Am. Mfrs. for the Republic of Mexico, Apartado 289, City of Mexico, Mexico		Jan. 3, 1900
Moncure, William Augustus. R. of W. Agt., P. R. R., Broad St. Station, Philadelphia, Pa.	Jun. Assoc. M.	June 21, 1894 Oct. 7, 1896
Monsarrat, Nicholas Daubeney. Chf. Engr., Sunday Creek Coal Co., 432 E. Broad St., Columbus, Ohio.	Jun. Assoc. M.	Feb, 5, 1895 Sept. 2, 1903
R. Montony, Liberty Gilbert. 128 Twelfth St., Troy, N. Y.	Jun. Assoc. M.	May 3, 1892 Feb. 5, 1896

		Date of Membership.
Moore, Charles Gillingham. Civ. and San. Engr., 189 Cleveland Ave., Buffalo, N. Y.		Mar. 5, 1902
Moore, Walter Sothoron. Supt., Cent. Ind. Ry., Anderson, Ind.		Mar. 7, 1900
Morey, Richard. Pres., Morey Eng. & Constr. Co., Equitable Bldg., St. Louis, Mo.		Jan. 2, 1901
Moritz, Charles Holland. Engr., The Pittsburgh Reduction Co., Niagara Falls, N. Y.		Oct. 2, 1901
Morrison, Eugene Taylor. Address unknown.		Jan. 2, 1901
Morrison, Harry Johnson. Div. Engr., Met. Water and Sewerage Board of Mass., 25 Leighton Ave., Clinton, Mass.		Jan. 4, 1899
Morrow, Jay Johnson. Capt., Corps of Engrs., U. S. A., Asst. to Engr. Commr. of the Dist. of Columbia, Dist. Bldg., Washington, D. C.		June 5, 1901
Moses, John Cranch. Chf. Draftsman, The Boston Bridge Works, Inc., Cambridge, Mass.	Jun. Assoc. M.	July 2, 1890 May 4, 1898
Moses, Percival Robert. Cons. Engr., 35 Nassau St., New York City.		Oct. 3, 1900
Moss, Castle Prentice. Box 535, New Westminster, B. C., Canada.		June 3, 1903
Moss, Robert Edward. Civ. and Structural Engr., 12 Elm St., New York City.		May 2, 1900
Mott, Daniel Livermore. Civ. Engr. and Contr. (Mott & Kemper), Utica, N. Y.		April 6, 1898
Mott, William Elton. Asst. Prof. of Civ. Eng., Cornell Univ., Ithaca, N. Y.		Mar. 5, 1902
Munroe, Hersey. Topographer, U. S. Geological Survey, Washington, D. C.		Mar. 5, 1902
Murphy, Edward Charles. Engr., U. S. Geological Survey, 82 V St., Washington, D. C.		Sept. 5, 1900
Murphy, Joseph Edgar. Div. Engr., C., B. & Q. R. R., Room 7½, C., B. & Q. Depot, Galesburg, Ill.		Sept. 2, 1903
Murray, Charles Warren. City Engr. and Supt. of Water-Works, City Hall Bldg., Americus, Ga.		Dec. 2, 1903
Myers, Edward Warren. U. S. Geological Survey, Roswell, N. Mex.		Oct. 2, 1901
Myers, John Hays. Asst. Engr., Rapid Transit R. R. Comm., 147 Columbus Ave., New York City.	Jun. Assoc. M.	Dec. 5, 1893 Oct. 5, 1898
Nagle, James C. Prof. of Civ. Eng. in the Agri. and Mech. Coll. of Texas, College Station, Tex.		April 5, 1899
Neff, Frank Howard. Prof. of Civ. Eng., Case School of Applied Science; Address, 1975 Doan St., Cleveland, Ohio.		May 6, 1903
Nelson, William. Of Firm of H. Bickford & Co., Lakeport, N. H.		June 6, 1900
Neumeyer, Robert Engler. Borough Engr. of the Towns of Bethlehem and South Bethlehem, 207 Broad St., Bethlehem, Pa.	Jun. Assoc. M.	May 31, 1892 Mar. 3, 1897
Neville, Colone Will Jackson. Eng. Dept., Am. Bridge Co., 120 Van Buren St., Chicago, Ill.	Jun. Assoc. M.	Oct. 1, 1901 June 3, 1903
Newberry, Spencer Baird. Gen. Mgr., Sandusky Portland Cement Co., Sandusky, Ohio.		Jan. 6, 1897
Newton, Ralph Eells. Cons. Engr., Newton Eng. Co., Milwaukee, Wis.		Jan. 8, 1902

ASSOCIATE MEMBERS N-P

		Date of Membership.
Nichols, Charles Henry. Cons. Engr., and Engr. of Connecticut Shell Fish Comm., New Haven, Conn	Jun. Assoc. M.	May 2, 1893 May 2, 1900
Nichols, Henry Francis. Gen. Mgr. and Engr., James Hill & Sons, 63 Grenfell St., Adelaide, South Australia		Oct. 1, 1902
Noble, Frederick Charles. Asst. Engr., Rapid Transit Comm., 4 Court Sq., Brooklyn, N. Y		June 4, 1902
Noble, Clarence Warren. 405 Brooklyn Ave., Kansas City, Mo		Feb. 3, 1904
Noble, Walter Edwin. City Hall, Fall River, Mass		April 2, 1902
Noska, George Albert. 33 East 17th St., New York City	Jun. Assoc. M.	Mar. 31, 1896 Sept. 3, 1902
Noyes, Harry Lincoln. Mech. Engr., Union Carbide Co., Niagara Falls, N. Y		June 5, 1901
O'Brien, Joseph Henry. Asst. Engr., Westinghouse, Church, Kerr & Co., 10 Bridge St., New York City		May 1, 1901
Oestreich, Henry Lewis, Jr. Asst. Engr., Rapid Transit Comm., 13 Astor Pl. (Res., 2092 Bathgate Ave.), New York City	Jun. Assoc. M.	Oct. 4, 1892 Dec. 6, 1899
Ogden, Henry Neely. Asst. Prof. of Civ. Eng., Cornell Univ. (Res., 614 University Ave.), Ithaca, N. Y	Jun. Assoc. M.	Oct. 3, 1893 Oct. 5, 1898
Olberg, Charles Real. Asst. Engr., U. S. Geological Survey, Washington, D. C		May 7, 1902
Olds, Clark. Erie, Pa		Mar. 1, 1899
Omberg, James Adolphus, Jr. City Engr., Memphis, Tenn		April 1, 1903
Orr, Alexander. Supt., Gloversville Water-Works, Gloversville, N. Y	Jun. Assoc. M.	June 4, 1901 Feb. 5, 1902
Osborn, Ollie Steele. Asst. Chf. Engr., C., B. & C. R. R., Bluffton, Ind		Oct. 2, 1901
Osbourn, Henry Van Buren. Tucson, Ariz		Sept. 3, 1902
Ostrander, John Edwin. Prof. of Math. and Civ. Eng., Mass. Agri. Coll., Amherst, Mass	Jun. Assoc. M.	May 2, 1888 Sept. 2, 1891
Paine, Hibbard Atwill. Res. Engr., Cherokee Constr. Co., Panama (Choctaw Nation), Ind. T		Feb. 4, 1903
Paquette, Charles Alfred. Supt., C., C., C. & St. L. Ry., Indianapolis, Ind		April 6, 1898
Parker, Charles Frederic. Supt. of Socavon Mines, Cia. Minera de Peñoles, Mapimi, Durango, Mexico	Jun. Assoc. M.	June 5, 1900 Sept. 2, 1903
Parsons, Archibald Livingstone. Civ. Engr., U. S. N., Mare Island Navy Yard, Cal		May 7, 1902
Parsons, Charles Edward. Chf. Engr., Hudson River Water Power Co., Glens Falls, N. Y		May 6, 1903
Peck, John Gates. Bridge Designer, Office of State Engr. (Res., 483 Hamilton St.), Albany, N. Y		Sept. 3, 1902
Pemoff, Joel Juk. Asst. Engr., Dept, of Docks and Ferries, Pier A, North River, New York City		Nov. 5, 1902
Perkins, Philo Sackett. Asst. Engr., N. Y., N. H. & H. R. R., 59 Chester Ave., Providence, R. I	Jun. Assoc. M.	Mar. 5, 1890 April 3, 1895

		Date of Membership.
Pettee, Eugene Everett. 269 Lowell Ave., Newtonville, Mass		Sept. 3, 1902
Pfau, Julius Welch. Masonry Expert, N. Y. State Engr.'s Office, Albany (Res., 510 Second Ave., Troy), N. Y		Dec. 2, 1903
Pfeifer, Herman Julius. Gen. Supt. of Constr., Street Dept., St. Louis, Mo		Sept. 6, 1899
Pharr, Harry Nelson. Chf. Engr., St. Francis Levee Dist., 168 Randolph Bldg., Memphis, Tenn		Oct. 3, 1900
Phillips, Frederick Clinton. Res. Engr., Bridge St. Viaduct, Jacksonville, Fla	Jun.	June 4, 1895
	Assoc. M.	April 4, 1900
Phillips, Howard Crathorne. Engr., Western Grand Div., A., T. & S. F. Ry., La Junta, Colo	Jun.	April 5, 1892
	Assoc. M.	Sept. 6, 1899
Pincombe, William Edwin. East Indian Ry., Calcutta, India		Feb. 4, 1903
Pitts, Thomas Dorsey. 41 Liberty St., New York City	Jun.	Dec. 7, 1897
	Assoc. M.	June 4, 1902
Pollock, Clarence DuBois. Asst. Engr., Bureau of Highways, Municipal Bldg., Brooklyn, N. Y		Jan. 8, 1902
Pope, Macy Stanton. Insp. for Factory Mutual Fire Insurance Cos., 31 Milk St., Boston, Mass		May 2, 1900
Porter, James Madison. Prof. Civ. Eng., Lafayette Coll., Easton, Pa.		May 4, 1892
Post, William Schuyler. Engr., Pacific Light & Power Co., 749 Garland Ave., Los Angeles, Cal		May 1, 1901
Potter, Alexander. Cons. Civ. Engr., 143 Liberty St., New York City	Jun.	Jan. 4, 1888
	Assoc. M.	Jan. 6, 1892
Pressey, Henry Albert. Civ. and Hydr. Engr., 1416 F St., Washington, D. C		May 1, 1901
Preston, Henry Wray. Engr., Elmira Plant, Empire Bridge Co., Elmira, N. Y		May 3, 1899
Prince, Arthur Dickson. Asst. Engr., Rapid Transit Comm., 13 Astor Pl., New York City	Jun.	May 5, 1896
	Assoc. M.	Oct. 3, 1900
Pritchard, Clifford Moses. Asst. Engr., Missouri Val. Bridge & Iron Works, 19th and Cherokee Sts., Leavenworth, Kans		April 1, 1903
Pritchard, Philip Morris. Chf. Engr., United Alkali Co., Ltd., Widnes, Lancashire, England		June 6, 1900
Pritchett, Charles Marcellus. Asst. Engr., U. S. Geological Survey, Washington, D. C		Sept. 2, 1903
Prouty, Edward Nathan. Asst. Prof. of R. R. Eng., Univ. of California, 2237 Vine St., Berkeley, Cal		Feb. 3, 1904
Pruyn, Francis Lansing. Treas., The United Eng. & Constr. Co., 13 Park Row, New York City	Jun.	Dec. 1, 1896
	Assoc. M.	June 7, 1899
Quick, Alfred Merritt. Pres. of Water Board and Water Engr., Baltimore, Md		Oct. 5, 1898
Race, John Marble. Housatonic, Mass		Mar. 5, 1902
Rainbow, John Roworth. 42 West 26th St., New York City		Jan. 6, 1904
Ramsey, Edmund Payton. Topographical Bureau, Borough of Queens, New York City (Res., 11 Flushing Ave., Brooklyn, N. Y.)	Jun.	Feb. 6, 1900
	Assoc. M.	Oct. 1, 1902

		Date of Membership.
Ramsey, Guy Robert. Track Engr. for T. C., I. & R. R. Co., Box 5, Ensley, Ala		Oct. 7, 1903
Reid, Homer Austin. Examining Engr., Comm. of Accounts, 280 Broadway (Res., 1 Hamilton Terrace), New York City		Dec. 4, 1901
Reynolds, Justin Oakley. Asst. Engr., Rapid Transit R. R. Comm., 2041 Washington Ave., New York City	Jun. Assoc. M.	Oct. 6, 1896 Dec. 5, 1900
Rhines, George Volney. Structural Designer, with Geo. S. Mills, Archt., 505 Gardner Bldg., Toledo, Ohio		June 3, 1903
Rhodes, Fred Dana. Structural Engr., 193 Garfield Ave., Jersey City, N. J.	Jun. Assoc. M.	June 6, 1899 Nov. 6, 1901
Rhys-Roberts, Edmund Alyth. Dominion Bridge Co., Ltd., Lachine Locks, Que., Canada		Nov. 3, 1897
Rickey, James Walter. Engr., St. Anthony Falls Water Power Co., Minneapolis, Minn		Sept. 3, 1902
Riegler, Louis John. Engr., Penn. Co., 417 Third St., Allegheny, Pa		Sept. 3, 1902
Rights, Lewis Daniel. Engr., Drawing Room No. 5, Am. Bridge Co., Ambridge, Pa		Mar. 5, 1902
Ripley, Theron Monroe. Room 15, Dimes Savings Bank, Marietta, Ohio		Nov. 6, 1901
Rittenhouse, Harvey. Delta, Colo	Jun. Assoc. M.	April 4, 1893 Dec. 7, 1898
Robbins, Allan Appleton. Res. Engr., Rapid Transit Subway Constr. Co., 1913 Amsterdam Ave., New York City		Oct. 2, 1901
Roberts, George Thomas. Engr. and Contr., 401 D. S. Morgan Bldg., Buffalo, N. Y.		Sept. 3, 1902
Roberts, William Jackson. Assoc. Prof. of Math. and Civ. Eng., Wash. Agri. Coll. and School of Science, Pullman, Wash.		June 6, 1900
Robertson, Marshall Pope. Mem., State Board of Engrs. of La., 225 Carondelet St., New Orleans, La		Mar. 5, 1902
Robinson, Holton Duncan. Chf. Draftsman, New East River Bridge, 84 Broadway, Brooklyn, N. Y. (Res., 357 West 121st St., New York City)	Jun. Assoc. M.	Mar. 1, 1893 Jan. 3, 1894
Rockenbach, Samuel Dickerson. Capt., 12th U. S. Cavalry, Chattanooga, Tenn		Feb. 6, 1901
Rockwell, James Vincent. Asst. Civ. Engr., U. S. N., Naval Academy, Annapolis, Md	Jun. Assoc. M.	April 3, 1900 Feb. 4, 1903
Rommel, George, Jr. Prin. Asst. Engr. with T. Chalkley Hatton, Cons. Engr., 233 Broome St., Wilmington, Del	Jun. Assoc. M.	Jan. 3, 1899 Mar. 5, 1902
Rosenberg, Friedrich. 1 Newark St., Hoboken, N. J.	Jun. Assoc. M.	Oct. 2, 1889 Jan. 6, 1892
Rosenthal, Albert. Supt., Westchester Lighting Co., Mt. Vernon, N. Y	Jun. Assoc. M.	Jan. 2, 1894 Nov. 6, 1901
Rosewater, William Marcus. With Heyl & Patterson, Contr. Engrs., Pittsburg, Pa		June 5, 1901
Ross, Elmer Wayland. Asst. Engr., Bridge Dept., City Engr.'s Office, Providence, R. I.	Jun. Assoc. M.	Mar. 5, 1890 June 1, 1892

		Date of Membership.
Ross, Thomas Alexander. Res. Engr., Imperial Chinese Ry. Administration, Shanghai, China		Dec. 3, 1902
Roundey, Eugene Peronneau. Asst. Hydrographer, U. S. Geological Survey, 39 West Street, Utica, N. Y.		Jan. 6, 1904
Rousseau, Harry Harwood. Civ. Engr., U. S. N., U. S. Navy Yard, Mare Island, Cal.	Jun. Assoc. M.	June 6, 1893 April 4, 1900
Rowell, George Freeman. Asst. Engr., Susquehanna Canal & Power Co., Conowingo, Md.	Jun. Assoc. M.	May 4, 1897 Jan. 2, 1901
Roy, Robert Maitland. Asst. to Vice-Pres. and Mgr., The Hamilton Bridge Works Co., Ltd., Hamilton, Ont., Canada		Oct. 3, 1900
Ruggles, Charles Arner. Eastern Mgr., Columbian Fireproofing Co., 1 Madison Ave., New York City		June 4, 1902
Russell, Richard Lord. Asst. Engr., Atlantic Ave. Impvt., 5 Hanson Pl., Brooklyn, N. Y.	Jun. Assoc. M.	Feb. 5, 1895 April 3, 1901
Sabin, Alvah Horton. Box 85, Long Island City, N. Y.		Mar. 4, 1896
Sabine, Edward Dana. Chf. Engr., Am. Pneumatic Service Co., 161 Devonshire St., Boston, Mass		Feb. 5, 1902
Sanders, Francis Nicoll. 235 State St., Albany, N. Y.		Sept. 3, 1902
Sanford, Harry Charles. Engr., The Degnon-McLean Contr. Co., 42d St. and 6th Ave., New York City		Oct. 5, 1898
Sargent, Joseph Andrews. Asst. Engr., Reclamation Service, U. S. Geological Survey, Montrose, Colo.		Oct. 2, 1901
Scammell, John Kimball. Asst. Engr., Public Works, Canada, Box 321, Saint John, N. B., Canada		June 4, 1902
Scarborough, Francis Winthrop. Engr., M. of W., C. & O. Ry., Richmond, Va.	Jun. Assoc. M.	Sept. 3, 1890 Mar. 6, 1895
Scharschmidt, Samuel Howard. Prin. Asst. Engr., Northern Ry. Co., Limon, Costa Rica		May 1, 1901
Schenk, Carl Louis Eduard. Contr. Engr., Steam Engines and Mine Equipments, 308 House Bldg., Pittsburg, Pa.		Oct. 1, 1902
Schmitt, Ewald. 311 Florida Ave., N. W., Washington, D. C.		Feb. 7, 1900
Schmitz, Frank Curtiss. Mgr., Phila. Office, Columbian Fireproofing Co., 1307 Real Estate Trust Bldg., Philadelphia, Pa.		Dec. 6, 1899
Schneider, Anton. Summit Hill, Carbon Co., Pa.		May 4, 1898
Schneider, Herman. Prof. of Civ. Eng., Univ. of Cincinnati, Cincinnati, Ohio		April 2, 1902
Schwiers, Frederick William. 704 West End Ave., New York City	Jun. Assoc. M.	June 5, 1900 Jan. 7, 1903
Scofield, Edson Mason. Pres. and Chf. Engr., The Scofield Co., Pittsburg, Pa. (also Philadelphia, Pa., and New York City.)		April 1, 1896
Sears, Robert Humphry. Engr. in Chg., Ondal Sainthia Ry., Raneeganj E. I. R., Bengal, India		Dec. 4, 1901
Seaton, William, Jr. Care C. W. Hunt Co., 45 Broadway, New York City		June 4, 1902

		Date of Membership.
Seltzer, Harry Kent. Res. Engr. for Waddell & Hedrick, Cons. Engrs. on the Provincial Govt. Fraser River Bridge, Lock Box 535, New Westminster, B. C., Canada	Jun. Assoc. M.	Feb. 4, 1896 Jan. 2, 1901
Senior, Samuel Palmer. Engr. and Supt., Bridgeport Hydr. Co., 323 Water St., Bridgeport, Conn		Oct. 7, 1903
Sesser, John Cornelious. Asst. Engr., C., B. & Q. R. R., Fulton, Ill	Jun. Assoc. M.	Sept. 5, 1899 April 1, 1903
Seurot, Paul Albert. Office Engr., North River Div., Penn., N. Y. & L. I. R. R., 20 West 34th St., New York City	Jun. Assoc. M.	April 30, 1895 Oct. 4, 1899
Shannahan, John Newton. Gen. Supt., Fonda, Johnstown & Gloversville R. R., Gloversville, N. Y	Jun. Assoc. M.	Oct. 4, 1898 Mar. 6, 1901
Shaw, Enos Larkin. 2667 N. Ashland Ave., Chicago, Ill	Jun. Assoc. M.	Oct. 3, 1893 June 1, 1898
Shellenberger, Leidy Rudy. 1102 E. Main St., Richmond, Va		May 2, 1900
Shepardson, John Eaton. Shabbona Grove, DeKalb Co., Ill		Jan. 7, 1903
Shima, Takejiro. Engr. to Imperial Govt. Ry. of Japan, Bayreutherstrasse 27/p, bei Frau Bierwagen, Berlin, W., Germany		Mar. 4, 1903
Shoemaker, Louis Henry. Engr., Estimating Office, Am. Bridge Co., Ambridge, Pa		Oct. 4, 1899
Shoemaker, Marshall Ney. Vice-Pres., Am. Concrete-Steel Co., Prudential Bldg., Newark, N. J		April 1, 1903
Short, William Ambrose Dudley. Supt., Signals, C., N. O. & T. P. Ry. (Res., 200 Market St.), Lexington, Ky		Feb. 5, 1902
Sickman, Albert Franklin. Hydr. Engr., Holyoke Water Power Co., Holyoke, Mass		Mar. 4, 1903
Simpson, Erastus Roland. Engr. and Gen. Mgr., Mech. Dept., Chapman Double Ball Bearing Co., Ltd., 39 Pearl St., Toronto, Ont., Canada		Nov. 4, 1903
Simpson, George. Asst. Chf. Engr. of the Thompson-Starrett Co., 51 Wall St., New York City		April 4, 1900
Skelly, James William. Junior Engr., U. S. Engr. Office, Custom House, St. Louis, Mo	Jun. Assoc. M.	May 2, 1899 April 1, 1903
Slayton, Charles Albert. Address unknown		Apr. 2, 1902
Smith, Albert. Saltsburg, Pa		Jan. 6, 1892
Smith, Albert Henry. Asst. Mech. Engr., Am. Bridge Co., 1309 Utah St., Toledo, Ohio		Oct. 2, 1901
Smith, Edgar Maverick. Engr., Railway Appliances Co., 1175 Old Colony Bldg., Chicago, Ill		Dec. 2, 1903
Smith, Leonard Sewall. Asst. Prof., Topographic and Geodetic Eng., Univ. of Wisconsin, 939 University Ave., Madison, Wis		June 2, 1897
Smith, Pemberton. Cons. Engr., New York Car Wheel Works, Buffalo, N. Y	Jun. Assoc. M.	Mar. 31, 1891 April 4, 1894
Smith, Walter Mickle. U. S. Engr. Office, Charleston, S. C		Oct. 2, 1901
Smith, William Stuart. New York State Mgr., Warren Bros. Co.; Dist. Mgr., Warren Chemical & Mfg. Co., 149 Main St., West, Rochester, N. Y		Jan. 8, 1902

		Date of Membership.
Smith, Wilson Fitch. Asst. Engr., Rapid Transit R. R. Comm. (Res., 36 West 36th St.), New York City	Jun. Assoc. M.	Jan. 3, 1895 May 1, 1901
Snow, Frank Herbert. (Snow & Barbour, Civ. and San. Engrs.), Tremont Bldg., Boston, Mass		June 4, 1895
Soper, George Albert. San. Engr., 29 Broadway, New York City		Feb. 6, 1901
Spencer, John Clark. Care, Eng. Dept., Am. Bridge Co., Ambridge, Pa		May 6, 1896
Spencer, Theodore Nelson. Asst. Engr. in Chg. of Torresdale Conduit, Impvt., Extension and Filtration of the Water Supply, City of Philadelphia, 1821 Mt. Vernon St., Philadelphia, Pa		Sept. 5, 1900
Spencer, Walter Tuttle. Div. Engr., N. Y., N. H. & H. R. R., New Haven, Conn	Jun. Assoc. M.	May 2, 1893 Oct. 4, 1899
Spielman, John Godfrey. 50 Wabansia Ave., Chicago, Ill	Jun. Assoc. M.	Mar. 4, 1891 May 1, 1895
Spofford, Charles Milton. Asst. Prof. of Civ. Eng., Mass. Inst. Tech., Boston, Mass		June 4, 1902
Stayton, Edward Moses. 423 East Kansas St., Independence, Mo		Feb. 4, 1903
Stearns, Edward Burnham. Contr. Mgr., Am. Bridge Co. of N. Y., 89 State St., Boston, Mass		June 1, 1898
Steece, Emmet Abner. City Engr., City Hall, Burlington, Iowa		Dec. 4, 1901
Steffens, William Frederick. Asst. Engr. (Bridges and Bldgs.), M. of W. Dept., N. Y. C. & H. R. R. R., 5 Vanderbilt Ave., New York City	Jun. Assoc. M.	April 3, 1900 Oct. 1, 1902
Stehle, Felix Charles. With Empire Bridge Co. at Brooklyn Plant; Address, 50 East 112th St., New York City		June 3, 1903
Stenger, Ernest. Asst. Supt., U. P. R. R., North Platte, Nebr		June 5, 1895
Stevens, Alexander. Supt. of Bldgs., N. Y. Fire Dept., 157 East 67th St., New York City		April 1, 1896
Stevens, Perley Egbert. 497 Carroll St., St. Paul, Minn	Jun. Assoc. M.	April 6, 1897 April 2, 1902
Steward, Spencer James. Eagle Hotel, New Berlin, N. Y		June 7, 1899
Stewart, Clinton Brown. Anchor, Ill		Oct. 5, 1898
Stickney, George Fetter. 715 Riverside Ave., Evansville, Ind	Jun. Assoc. M.	May 1, 1894 April 5, 1899
Stidham, Harrison. Am. Bridge Co., 7 West 22d St., New York City		April 4, 1900
Stockett, Alfred Walton. Gen. Mgr., The West Roodepoort Deep, Ltd., P. O. Box 6051, Johannesburg, Transvaal, South Africa		Jan. 1, 1896
Storrow, Samuel. Civ. and Min. Engr., 402 Douglas Bldg., Los Angeles, Cal	Jun. Assoc. M.	Sept. 10, 1891 Oct. 2, 1895
Stowe, Harold Clair. Contr. Engr. (Clarke & Stowe), 232 Kent St., Brooklyn, N. Y		April 7, 1897
Strahan, Charles Morton. Univ. of Ga., Athens, Ga		June 1, 1898
Stratton, George Draper. Asst. Engr., Western Div., S. P. R. R., 1039 Union St., Oakland, Cal		Oct. 4, 1899
Stratton, George Eber. Asst. Engr., U. S. Geological Survey, Washington, D. C		Jan. 8, 1902
Strawn, Thomas Corwin. 211 West 101st St., New York City	Jun. Assoc. M.	Nov. 5, 1901 June 3, 1903

		Date of Membership.
Strehlow, Oscar Emil. U. S. Asst. Engr., Demopolis, Ala		Mar. 6, 1901
Strickler, Gratz Brown. Supt. of Constr., U. S. Public Bldgs., Chg. of Erection of Govt. Bldgs., La. Purchase Exposition, St. Louis, Mo	Jun. Assoc. M.	Jan. 5, 1897 Jan. 4, 1899
Strong, William Edward Schenck. Mgr. of Eng. Dept., Care, Am. Radiator Co., Chicago, Ill		April 6, 1898
Stuart, James Lyall. 1206 Westinghouse Bldg., Pittsburg, Pa	Jun. Assoc. M.	Oct. 4, 1898 Feb. 7, 1900
Sumner, Robert Swan. 1639 Race St., Denver, Colo		June 3, 1903
Swaab, Solomon Mark. Engr. in Chg., Constr., Lardners Point Pumping Station, Philadelphia, Pa	Jun. Assoc. M.	May 3, 1898 Nov. 1, 1899
Sweitzer, Nelson Bowman. Care, U. S. Surv. Gen., Portland, Ore	Jun. Assoc. M.	Feb. 28, 1893 Mar. 1, 1899
Swift, William Everett. Engr., U. S. G. S. Reclamation Service, Wadsworth, Nev		Sept. 2, 1903
Sykes, George Whitfield. Civ. and Cons. Engr., Beaumont, Tex	Jun. Assoc. M.	April 30, 1895 Dec. 1, 1897
Taber, George Aymar. Asst. to Chf. Engr., Dept. of Water Supply, Park Row Bldg., New York City	Jun. Assoc. M.	April 30, 1895 June 7, 1899
Tainter, Frank Stone. 92 William St., New York City		Jan. 3, 1900
Tait, Harold. Asst. Engr., Bureau of Sewers, Hackett Bldg., Long Island City, N. Y		May 7, 1902
Tait, John George. 849 Burlington Ave., Los Angeles, Cal		May 6, 1896
Taylor, Charles Frederick. Treas., Boston Tunnel Constr. Co., 23 Lewis St., East Boston, Mass		Sept. 4, 1895
Theban, John Gerard. Engr. in Chg. of Dept. of Bridges, Borough of the Bronx, Mott Ave. and 138th St., New York City		Mar. 3, 1897
Thomas, Samuel Richards. Engr. and M. M., Ironton R. R., Chairman, Lehigh Fire Brick Co., Ltd., Hokendauqua, Pa	Jun. Assoc. M.	Oct. 4, 1892 Mar. 1, 1899
Thomes, Edwin Howard. Asst. Engr., 1st Div., Rapid Transit Comm. (Res., 150 Willett St.), Jamaica, N. Y		Dec. 6, 1899
Thompson, Arthur Webster. Supt., B. & O. Ry., Cumberland, Md		June 4, 1902
Thompson, Clark Wallace. Vice-Pres., Wind River Lumber Co., Cascade Locks, Ore	Jun. Assoc. M.	Mar. 5, 1890 July 3, 1895
Thompson, Mackey James. La Crosse, Wis		Oct. 7, 1903
Thompson, Robert Andrew. Chf. Engr., R. R. Comm. of Texas, Austin, Tex	Jun. Assoc. M.	April 6, 1897 Oct. 4, 1899
Thompson, Sanford Eleazer. Newton Highlands, Mass		April 1, 1896
Thomson, Alexander, Jr. Asst. Engr., Rapid Transit Comm., 4 Court Sq. (Res., 351a Quincy St.), Brooklyn, N. Y	Jun. Assoc. M.	Dec. 4, 1900 Feb. 3, 1904
Thomson, Ernest Burslem. U. S. Asst. Engr., U. S. Engr. Office, Jacksonville, Fla		June 5, 1901
Thornley, Julian. Senior Asst. Engr., Elec. Development Co. of Ontario, Ltd., Niagara Falls, Ont., Canada		Jan. 2, 1901

		Date of Membership.
Throop, Augustus Thompson. Mgr., A. T. Throop & Co., Cons. Civ. Engrs., Erie County Bank Bldg., Buffalo, N. Y.	Jun. Assoc. M.	Oct. 3, 1893 Mar. 3, 1897
Tidd, Arthur Warren. Care, Charles River Basin Comm., 367 Boylston St., Boston, Mass.		June 3, 1903
Tighe, James Lawrence. City Engr.; Engr., Holyoke Water-Works, Holyoke, Mass.		Oct. 5, 1898
Tilden, Charles Joseph. Instr. Civ. Eng., Cornell Univ., 109 Cascadilla Pl., Ithaca, N. Y.	Jun. Assoc. M.	May 31, 1898 Feb. 5, 1902
Todd, Alexander Miller. U. S. Asst. Engr., Box 167, Greenville, Miss.	Jun. Assoc. M.	Oct. 1, 1895 Oct. 2, 1901
Toltz, Max. Mech. Engr., Great Northern Ry., St. Paul, Minn.		Sept. 7, 1892
Tompkins, Edward De Voe. 255 Steuben St., Brooklyn, N. Y.	Jun. Assoc. M.	Feb. 2, 1897 Dec. 3, 1902
Tonkin Thomas, Juan. Hydr. Engr., Care, Flint, Eddy & Am. Trading Co., 30 Broad St., New York City		Mar. 7, 1900
Tower, James Wallace. Prin. Asst. Engr., Great Northern Paper Co., Millinocket, Me.		Oct. 2, 1901
Towle, Charles Stewart. 7 East 42d St., New York City		May 3, 1899
Towson, Morris Sherman. 16 Bolton Ave., Cleveland, Ohio		Nov. 1, 1893
N. **Tratman, Edward Ernest Russell.** 1636 Monadnock Blk., Chicago, Ill.	Jun. Assoc. M.	April 7, 1886 July 1, 1891
Travell, Warren Bertram. Robins Conveying Belt Co., Park Row Bldg., New York City	Jun. Assoc. M.	April 30, 1895 Mar. 5, 1902
Treadway, Howard Platt. Pres., Kansas City Bridge Co., 1109 McGee St., Kansas City, Mo.		May 6, 1903
Tripp, Oscar Holmes. Room 30, Court House, Rockland, Me.		Oct. 7, 1896
Trout, Charles Eliphalet. West New Brighton, N. Y.	Jun. Assoc. M.	Oct. 31, 1899 Jan. 8, 1902
Tsuji, Taro. Engr., Govt. Ry. Office, 24 Hongo Umicho Nichome, Tokyo, Japan	Jun. Assoc. M.	Oct. 8, 1891 Oct. 4, 1899
Tucker, William Conquest. Civ. and San. Engr., 156 Fifth Ave., New York City	Jun. Assoc. M.	May 5, 1891 Dec. 5, 1894
Turneaure, Frederick Eugene. Prof. of Bridge and San. Eng., Univ. of Wis., Madison, Wis.	Assoc. Assoc. M.	Aug. 31, 1897 June 4, 1902
Turner, Daniel Lawrence. 220 West 107th St., New York City		Feb. 2, 1898
Turner, George Dallas Baird. Gen. Mgr., J. I. C. Min. & Milling Co., 259 Commercial Club Bldg., Salt Lake City, Utah		Nov. 2, 1898
Tyrrell, Warren Ayres. Cons. Engr., 620 Chestnut St., St. Louis, Mo.	Jun. Assoc. M.	Oct. 2, 1900 Oct. 1, 1902
Ulrich, Daniel. Div. Engr., Aqueduct Comm., Jerome Park Reservoir, New York City		Sept. 1, 1897
Upham, Richard Dana. 11 Broadway, New York City	Assoc. Assoc. M.	Oct. 6, 1896 April 3, 1901
Urquhart, George Copeland. Real Estate Agt., Penn. Lines, 1104 Union Station Bldg., Pittsburg, Pa.		May 6, 1891

		Date of Membership.
Vail, Charles Davis. Civ. and Hydr. Engr., Room 12, Bee Hive Bldg., Butte, Mont.		June 6, 1900
Van Alstyne, Henry Arthur. Div. Engr., N. Y. State, State Hall, Albany, N. Y.		June 6, 1900
Van Buskirk, Clarence Randall. 108 Van Sicklen St., Brooklyn, N. Y.		Feb. 3, 1897
Van Cleve, Aaron Howell. Prin. Asst Engr., The Niagara Falls Power Co. (Res., 138 First St.), Niagara Falls, N. Y.	Jun. Assoc. M.	May 31, 1892 Dec. 5, 1894
Van Etten, Lawrence Edward. New Rochelle, N. Y.		Dec. 6, 1899
Van Loan, Seth Morton. First Asst. Engr. in Chg., Lardners Point Pipe Distrib. System, 2203 Bridge St., Frankford, Pa	Jun. Assoc. M.	Dec. 28, 1900 Oct. 7, 1903
Van Norden, Earnest Maitland. 26 St. Charles Pl., Brooklyn, N. Y.		May 6, 1903
Van Pelt, Sutton. U. S. Engr. Office, Tuscaloosa, Ala.	Jun. Assoc. M.	Mar. 6, 1900 Dec. 2, 1903
Vedeler, Gerdt Henrik. Afdelingsingeniör, Den tekniske Revision, Departementet for de offentlige Arbeider, Victoria Terasse 13, Christiania, Norway		June 7, 1893
Venable, William Mayo. Local Mgr., National Contr. Co., 708 Hennen Bldg., New Orleans, La		Sept. 4, 1901
Verveer, Emanuel Louis. Contr. Engr., Milliken Bros., 11 Broadway, New York City		June 3, 1903
Vickers, Thomas McElderry. Mgr., Empire Mfg. Co., Auburn, N. Y., and Waldorf Mfg. Co., Seneca Falls, N. Y., 212 Wayne St., Syracuse, N. Y.		Mar. 2, 1898
Vier, Henry. Engr. of Resurveys, Eng. Dept., N. Y. C. & H. R. R. R. Co., Room 400, Grand Central Station, New York City		Feb. 7, 1900
Villalon, José Ramon. Prof., Univ. of Havana, Obrapia 14, Havana, Cuba	Jun. Assoc. M.	July 4, 1888 Nov. 6, 1895
Vinton, Thomas MacIntire. Secy. and Treas., Tucker & Vinton, 156 Fifth Ave., New York City		Feb. 3, 1904
Vogleson, John Albert. First Asst. Engr., Bureau of Filtration, Torresdale Filters, Station M, Philadelphia, Pa.		Jan. 2, 1901
von Unwerth, Hans. Asst. Engr. to Waddell & Hedrick, Cons. Engrs., 608 New Nelson Bldg., Kansas City, Mo		May 6, 1903
Voorhees, Paul. Engr., The Buffalo & Susquehanna Iron Co. (Res., 195 Lockwood Ave.), Buffalo, N. Y.		Feb. 3, 1892
Vredenburgh, Watson, Jr. 50 Broadway, New York City		Mar. 6, 1901
Vrooman, Morrell. City Engr., Gloversville, N. Y.		May 7, 1902
Wada, Yoshichika. Doboku-kwantoku-cho, Nugata, Japan.	Jun. Assoc. M.	Sept. 7, 1887 Oct. 2, 1895
Wadsworth, Joel Edward. Res. Engr., Am. Bridge Co., 7 West 22d St., New York City	Jun. Assoc. M.	Dec. 5, 1893 May 5, 1897
Wagner, Joseph Christian. Surv. and Regulator, 9th Survey Dist., Dept. of Public Works, Philadelphia; Office, Chelton Ave. and Greene St., Germantown (Res., 1539 North 12th St.), Philadelphia, Pa		June 7, 1899

		Date of Membership.
Waite, Guy Bennett. Pres. and Treas., Guy B. Waite Co., 352 West 115th St., New York City		May 2, 1894
Waitt, Charles Greene. Sheldon St., East Milton, Mass	Jun. Assoc. M.	Aug. 31, 1897 Oct. 5, 1898
Waldron, Samuel Payson. Engr., Berlin Plant, Am. Bridge Co., East Berlin, Conn		Jan. 7, 1903
Walker, Clement Isaac. Chf. Engr., Union Subway Constr. Co., 113 West 38th St., New York City		April 1, 1891
Walker, Joseph Jeanes. 7 West 22d St., New York City		Nov. 5, 1902
Walker, Joseph Milton. Supt. and Chf. Engr., Track and Roadway, Penn. & Mahoning Val. Ry., Youngstown, Ohio		April 3, 1901
Wallace, William McGehee. 616 Eighteenth St., N. W., Washington, D. C	Jun. Assoc. M.	April 3, 1894 Nov. 6, 1901
Walsh, George Scherzer. Res. Engr., Salvador Ry. Co., Ltd., San Salvador, Salvador	Jun. Assoc. M.	Feb. 2, 1897 May 1, 1901
Walther, Edward. Archt., Civ. and Mech. Engr., Logan Sq., Chicago, Ill		May 1, 1895
Warman, Fred Conover. U. S. Asst. Engr., 2001 I St., N. W., Washington, D. C		Jan. 3, 1900
Warrington, Harry Esmond. Asst. Engr., C., N. O. & T. P. Ry. Co., 205 Odd Fellows' Temple, Cincinnati, Ohio		April 6, 1898
Washington, William de Hertburne. 1 Broadway, New York City		Oct. 5, 1892
Watson, Irvine. Chf. Engr., City Ry. Co., 7 Board of Trade Bldg., Wheeling, W. Va		June 3, 1903
Watson, Walter. 608 Frederic St., Staunton, Va		April 5, 1893
Watson, Wilbur Jay. Bridge Engr., The Osborn Eng. Co., Osborn Bldg., Cleveland, Ohio	Jun. Assoc. M.	Oct. 4, 1898 Jan. 2, 1901
Webb, Walter Loring. Cons. Engr., 810 Girard Trust Bldg., Philadelphia, Pa		May 4, 1892
Webster, Albert Lowry. 82 Wall St., New York City	Jun. Assoc. M.	Sept. 6, 1882 June 3, 1891
Wentworth, Charles Austin. Civ. Engr., U. S. N., 1437 Rhode Island Ave., Washington, D. C		Oct. 7, 1903
Weston, Robert Spurr. San. Engr., 14 Beacon St., Boston, Mass		Feb. 5, 1902
Weymouth, Frank Elwin. Asst. Engr., U. S. Reclamation Service, Washington, D. C		Sept. 4, 1901
Wheatley, Arthur Cornwallis. Address unknown	Jun. Assoc. M.	May 7, 1890 Mar. 6, 1895
Wheeler, Harry Roberts. 1 Broadway, New York City	Jun. Assoc. M.	April 4, 1888 May 4, 1892
Wheeler, Ralph Norman. Asst. Engr., Rapid Transit R. R. Comm., 120 Liberty St., New York City		Jan. 7, 1903
Wheelock, De Forest Augustus. City Engr.; Chf. Engr., Elk & Highland R. R. Co., Warren, Pa		Feb. 3, 1897
Whipple, George Chandler. Biologist and Director of Mt. Prospect Laboratory, Dept. of Water Supply, Gas and Electricity, Flatbush Ave. and Eastern Parkway, Brooklyn, N. Y		Sept. 6, 1899

		Date of Membership.
Whiskeman, James Peter. Civ. Engr., Bureau of Bldgs., Borough of Manhattan, 220 Fourth Ave., New York City)	Jun. Assoc. M.	Jan. 31, 1899 Nov. 7, 1900
White, Lazarus. Asst. Engr., Rapid Transit R. R. Comm., 4 Court Sq., Brooklyn, N. Y. (Res., 95 West 119th St., New York City)	Jun. Assoc. M.	May 1, 1900 Feb. 4, 1903
White, William MacIntire. Asst., Eng. Dept., Am. Bridge Co., Ambridge, Pa		Jan. 2, 1901
Whited, Willis. Asst. Engr., Bureau of Constr., Dept. Public Works, City Hall, Pittsburg, Pa		Oct. 2, 1901
Whittemore, Walter Frank. 1 Newark St., Hoboken, N. J.	Jun. Assoc. M.	Mar. 6, 1889 April 6, 1892
Wickes, Edward Dana. Min. Engr., Low Moor Iron Co. of Va., Low Moor, Va		Dec. 3, 1902
Wiggin, Ernest Woodbury. Asst. Bridge Engr., N. Y., N. H. & H. R. R., New Haven, Conn	Jun. Assoc. M.	May 5, 1896 May 7, 1902
Wiggin, Thomas Hollis. 556 Dean St., Brooklyn, N. Y		April 2, 1902
Wiggins, William D. Engr., M. of W., Pittsburg Div., P., C., C. & St. L. Ry. Co., 1013 Penn Ave., Pittsburg, Pa		Oct. 2, 1901
Wilcox, Fred Elmer. Cons. Engr., 956 Orange Grove Boulevard, Pasadena, Cal		April 1, 1896
Wilkerson, Thomas Jefferson. Asst. to Div. Mgr., Am. Bridge Co., 51st St., Pittsburg, Pa	Jun. Assoc. M.	April 3, 1894 Jan. 5, 1898
Wilkes, James Knapp. Chf. Engr. of Sewers, City Hall, New Rochelle, N. Y		June 3, 1891
Wilkins, George Shreve. Care, H. F. Ayres, 203 West 14th St., New York City	Jun. Assoc. M.	Oct. 4, 1892 Oct. 5, 1898
Williams, Charles Page. U. S. Engr. Office, New London, Conn		Oct. 2, 1901
Williams, Samuel Daugherty, Jr. P. O. Box 346, Toledo, Ohio		Dec. 2, 1903
Wills, Arthur John. 27 Maryland Ave., Annapolis, Md		May 7, 1902
Wilson, Charles William Schrage. Engr., Naughton Co., 258 Broadway, New York City (Res., New Rochelle, N. Y.)	Jun. Assoc. M.	April 5, 1892 Jan. 3, 1900
Wilson, Everett Broomall. Engr. in Chg., Newark (N. J.) Track Elevation, P. R. R. Co.; Address, 78 Elm Ave., Rahway, N. J.		Mar. 4, 1903
Wilson, Henry Felix, Jr. Cons., Civ. and Min. Engr. (Wilson & Alber), Room 204, First National Bank Bldg., Birmingham, Ala.		April 2, 1902
Wilson, Percy Hartshorne. Secy. and Treas., River & Harbor Impvt. Co., 801 Drexel Bldg., Philadelphia, Pa	Jun. Assoc. M.	Jan. 2, 1900 Feb. 5, 1902
Wilson, Thomas William. Chf. Engr., International Ry. Co., Buffalo, N. Y		April 4, 1900
Wiltsee, William Pharo. Asst. Engr., Norfolk & West. Ry., Kenova, W. Va		Oct. 7, 1903
Winfree, Peyton Brown. Cons. Engr., Lynchburg, Va.	Jun. Assoc. M.	Oct. 2, 1894 May 3, 1898
Wing, Charles Benjamin. Prof. of Structural Eng., Stanford Univ., Palo Alto, Cal		Nov. 4, 1896

		Date of Membership.
Wing, Frederick Kelly. 110 White Bldg., Buffalo, N. Y.	Jun. Assoc. M.	May 31, 1892 Nov. 1, 1899
Winn, Walter Scott. U. S. Asst. Engr., Kingman, Ala.		Oct. 6, 1897
Winsor, Frank Edward. Div. Engr., Charles River Basin Comm., 367 Boylston St., Boston, Mass.		Nov. 4, 1903
Wolf, Julius Herman George. Asst. Engr., U. S. Engr. Office, 92 Flood Bldg., San Francisco, Cal.		May 7, 1902
Wood, Irving Sparrow. Asst. Engr. in Chg. of Water Dept., City Engr.'s Office, Providence, R. I.	Jun. Assoc. M.	Mar. 5, 1890 Mar. 7, 1900
Woodard, Silas H. Care, Penn., N. Y. & L. I. R. R., 20 West 34th St., Room 83, New York City		Jan. 2, 1901
Woodruff, James Albert. 1st Lieut. Corps of Engrs, U. S. A., West Point, N. Y.		Dec. 2, 1903
Wortendyke, Nicholas Doremus. Asst. Chf. Engr., Board of Street and Water Commrs. (Res., 108 Bentley Ave.), Jersey City, N. J.		Feb. 1, 1899
Wright, Joseph Bodine. Structural Engr. with Milliken Bros., 11 Broadway (Res., 150 West 80th St.), New York City		June 2, 1897
Wright, Moses Hannibal. Asst. Engr., L. & N. R. R. Co., Birmingham, Ala.	Jun. Assoc. M.	Jan. 2, 1900 Sept. 3, 1902
Yereance, William Burnet. 418 Center St., South Orange, N. J.	Jun. Assoc. M.	May 3, 1892 Dec. 2, 1896
Young, Eddy Elbert. 426 West 23d St., New York City		Jan. 6, 1904
Young, Henry Amerman. In Chg. of Constr. Work for U. S. Engr. Dept. at Fort Washington, Md., and at Fort Hunt, Va.; Address, U. S. Engr. Office, Fort Washington, Md.	Jun. Assoc. M.	Mar. 5, 1901 Dec. 2, 1903
Zarbell, Elmer. Asst. Engr., L. & N. R. R. Co., Chf. Engr.'s Office, Louisville, Ky.	Jun. Assoc. M.	Jan. 3, 1899 Feb. 7, 1900
Zeller, Albert Henry. 1000 Fullerton Bldg., St. Louis, Mo.	Jun. Assoc. M.	May 7, 1890 April 7, 1897

Associate Members, 820.

ASSOCIATES.

[Assoc. Am. Soc. C. E.]

		Date of Membership.
ABBOTT, EDWARD LORENZO. 71 Broadway, New York City	Jun. Assoc.	Sept. 1, 1886 April 30, 1895
ABBOTT, WILLIAM LATHAM. Westinghouse Bldg., Pittsburg, Pa		May 1, 1889
ACKERMAN, ERNEST ROBINSON. 1 Broadway, New York City		May 1, 1900
AUCHINCLOSS, JOHN WINTHROP. 22 William St., New York City		April 2, 1901
BARNES, WILLIAM HENRY. Pres. of the Allegheny Val. Ry. Co. and the West. N. Y. & Penn. Ry. Co. (Buffalo and Allegheny Div. of P. R. R. Co.), 256 Gen. Office, P. R. R. Co., Philadelphia, Pa		Sept. 2, 1885
BELDEN, EDGAR TWEEDY. Lawn Ave., Middletown, Conn		Mar. 5, 1901
BENNETT, LESLIE J. Secy., Buffalo Cement Co., 110 Franklin St., Buffalo, N. Y		Jan. 7, 1902
BENT, STEDMAN. Purchasing Agt., The Maryland Steel Co., The Pennsylvania Steel Co., Overbrook, Montgomery Co., Pa		Dec. 2, 1902
BERNEGAU, RUDOLF CASPAR CARL MARIE. Treas., Keuffel & Esser Co., 127 Fulton St., New York City		Feb. 3, 1903
BERTHELET, JOSEPH R. Mgr., Milwaukee Cement Co., Milwaukee, Wis		Nov. 1, 1898
BOGART, SAMUEL STOCKTON. Engr., The New York Continental Jewell Filtration Co., 15 Broad St., New York City (Res., Dumont, Bergen Co., N. J.)		April 7, 1886
BOOTH, WILLIAM FERRIS. Poughkeepsie, N. Y.	Jun. Assoc.	Jan. 7, 1885 April 30, 1895
BRADLEY, CHARLES WHITING. 1064 Ellicott Sq., Buffalo, N. Y		June 19, 1891
BRAINE, LAWRENCE FULTON. Gen. Mgr., Continuous Rail Joint Co. of America, Newark, N. J		Sept. 6, 1898
BROWN, THANE ROSS. With Wisconsin Bridge & Iron Co., North Milwaukee, Wis	Jun. Assoc.	Mar. 31, 1896 Oct. 2, 1900
BURNHAM, GEORGE, Jr. (Burnham, Williams & Co.), Baldwin Locomotive Works, Philadelphia, Pa	Jun. Assoc.	Jan. 6, 1875 July 2, 1890
BURROWS, GEORGE LORD. Saginaw, W. S., Mich		Feb. 3, 1886
CHAPMAN, MELLVILLE DOUGLAS. Banker and Broker (E. R. Chapman & Co.), 80 Broadway, New York City		Sept. 1, 1896
CHURCH, IRVING PORTER. Prof. of Applied Mechanics and Hydraulics, Cornell Univ., Ithaca, N. Y		Oct. 1, 1901
CLARK, LUDLOW VICTOR. 619 Harrison Bldg., Philadelphia, Pa		Oct. 4, 1892

		Date of Membership.
Colby, Safford Kinkead. Contr. Engr. and Mgr., Eastern Office, The Pittsburg Reduction Co., 99 John St., New York City	Jun. Assoc.	Mar. 5, 1895 Jan. 6, 1904
Colsten, Albert Lloyd. Teacher, Manual Training High School, Brooklyn, N. Y.		Sept. 3, 1901
Comfort, Silas Gildersleeve. Vice-Pres. and Prof. of Eng., Pennsylvania Military Coll., Chester, Pa		Mar. 31, 1891
Compton, Alfred G. Prof. of Physics, The Coll. of the City of New York, 17 Lexington Ave. (Res., 40 West 126th St.), New York City		Sept. 5, 1877
Copeland, William Rogers. 1904 Green St., Philadelphia, Pa		Feb. 4, 1902
Crafts, George Henry. Civ. Engr. and Bridge Contr., 164 Forest Ave., Atlanta, Ga		April 4, 1888
Currier, Charles Gilman. 313 West 102d St., New York City		June 21, 1894
Dewey, Charles Ellis. 28 Flower Bldg., Watertown, N. Y.		Nov. 5, 1901
Diven, John M. Secy. and Treas., Elmira Water, Light & R. R. Co., Elmira, N. Y.		Sept. 10, 1891
Douglass, Anthony Chileon. Gen. Contr., Niagara Falls, N. Y.		April 30, 1895
Drummond, Thomas Joseph. Pres., Londonderry Iron & Min. Co., Ltd., Montreal, Que., Canada		Mar. 6, 1894
DuBarry, Edmund Louis. Supt., Terminals, N. & W. Ry., Norfolk, Va.		Jan. 6, 1875
Eckel, Edwin Clarence. Asst. Geologist, U. S. Geological Survey, Washington, D. C.		Mar. 5, 1901
Elliott, Howard. Pres., N. P. Ry. Co., St. Paul, Minn		June 5, 1900
Farrell. Edward James. 159 West 125th St., New York City		June 6, 1899
Fishburne, Edward Bell, Jr. Pres., Hoge Memorial Military Academy, Blackstone, Va.		Dec. 5, 1899
Fisk, Wilbur Chapman. 24 Nassau St., New York City		Oct. 4, 1892
Fletcher, Robert. Prof. of Civ. Eng., Director of the Thayer School of Civ. Eng., Dartmouth Coll., Hanover, N. H.		Nov. 4, 1874
Foster, Clarence Marvin. Secy., Meacham & Wright Co., 920 Chamber of Commerce Bldg., Chicago, Ill		Jan. 31, 1899
Freeman, Frank Leslie. 1756 N St., Washington, D. C.		Nov. 5, 1895
Frost, George Henry. Pres. and Treas., Eng. News Pub. Co., 220 Broadway, New York City		Jan. 4, 1882
Fuller, Almon Homer. Prof. of Civ. Eng., Univ. of Washington, University Station, Seattle, Wash	Jun. Assoc.	April 4, 1899 Feb. 4, 1902
Futami, Kyosaburo. Prof. of Civ. Eng., Kyoto Imperial Univ., Kyoto, Japan		June 5, 1889
Gaines, Franklin Lincoln. Vice-Pres. and Gen. Supt. of Constr., Grand Rapids Bridge Co., 612 Pythian Temple, Grand Rapids, Mich		April 1, 1902

ASSOCIATES G–L

		Date of Membership.
Gibson, William, Jr. 122 Fenimore St., Brooklyn, N. Y.		Sept. 5, 1888
Gildersleeve, Alger Crocheron. 39 Cortlandt St. (Res., 28 West 48th St.), New York City.	Jun. Assoc.	Feb. 6, 1894 April 4, 1899
Golding, John French. Pres., Expanded Metal Eng. Co., 256 Broadway, New York City		Feb. 3, 1904
Goldsborough, John Byron. Supt. Constr., New Croton Dam, Croton-on-Hudson, N. Y.		April 4, 1899
Goodell, John Milton. Editor, *The Engineering Record*, 114 Liberty St., New York City		July 29, 1891
Graham, William Woodman. Care, American Bank, City of Mexico, Mexico		Dec. 6, 1898
Griffin, Patrick Henry. Pres., New York Car Wheel Works, Buffalo, N. Y.		Oct. 1, 1890
Hardwicke, Alan Hyde Gardner. Niagara Falls, N. Y.		June 4, 1884
Harris, Charles Marshall. 58 William St., New York City.		Jan. 8, 1873
Harrison, Louis Baldwin. Fifth Ave. Hotel, Troy, N. Y.		May 5, 1896
Hartranft, William Garrigues. Pres., Wm. G. Hartranft Cement Co., Real Estate Trust Bldg., Philadelphia, Pa.		May 3, 1898
Hazen, John Vose. Prof. of Civ. Eng. and Graphics, Dartmouth Coll., Hanover, N. H.		June 5, 1889
Hennessey, Charles Francis Asa. 948 Park Ave, New York City		Jan. 7, 1902
Hunsiker, Millard. 4 Park St., Park Lane, London, W., England		June 5, 1889
Huston, James Archibald. Gen. Mgr., Am. Bridge Co., 826 Frick Bldg., Pittsburg, Pa.		Aug. 31, 1897
Jacoby, Henry Sylvester. Prof. of Bridge Eng., Cornell Univ., 7 Reservoir Ave., Ithaca, N. Y.		Nov. 5, 1890
Johnston, John Parry. 822 Marquette Bldg., Chicago, Ill.		April 3, 1894
Kaltenbach, Henry Julius. Park Hill, Yonkers, N. Y.		June 3, 1902
Karner, William Josiah. 4353 Berkley Ave., Chicago, Ill.		July 2, 1890
Keller, Otto Balthazar. Eng. and Govt. Representative of Keuffel Esser Co., 127 Fulton St., New York City		Feb. 3, 1903
King, Harry Wheelock. Vice-Pres., The King Bridge Co., Cleveland, Ohio.		June 19, 1891
King, Wallace, Jr. Vice-Pres., United Bldg. Material Co., 13 Park Row, New York City		Dec. 4, 1900
La Farge, Oliver Hazard Perry. Insurance, 343 Arcade Bldg., Seattle, Wash.		April 5, 1898
Lesley, Robert Whitman. Pres., Am. Cement Co., 22 South 15th St., Philadelphia, Pa.		Jan. 31, 1893
Liebmann, Alfred. 58 West 58th St., New York City		June 3, 1902
Lindenberger, Cassius Howard. Defiance, Ohio		Feb. 2, 1892
Livingston, Julius I. Bound Brook, N. J.		July 3, 1889
Lowe, Houston. Vice-Pres., The Lowe Bros. Co., Dayton, Ohio		June 3, 1902

		Date of Membership.
MacGregor, John. Asst. Engr., United States Fidelity & Guaranty Co. of Baltimore, Md., Buffalo, N. Y.		June 2, 1903
McKenna, Charles Francis. Chemist, 221 Pearl St., New York City.		June 5, 1894
Maignen, Jean Prosper Auguste. 1310 Arch St., Philadelphia, Pa.		Oct. 3, 1899
Mann, John Laroy. Assoc. Prof. Civ. Eng., Thayer School of Civ. Eng., Hanover, N. H.	Jun. Assoc.	April 2, 1901 May 6, 1902
Meyer, Henry Coddington, Jr. Cons. Mech. Engr., 1 Madison Ave., New York City (Res., Montclair, N. J.)	Jun. Assoc.	Jan. 3, 1893 Dec. 28, 1900
Monks, John, Jr. 130 Water St. (Res., 139 West 121st St.), New York City		May 31, 1898
Moxham, Arthur James. Vice-Pres., E. J. du Pont de Nemours Powder Co., Wilmington, Del		Nov. 2, 1887
Norton, Henry Lord. Engr. and Contr. (Collins & Norton), 33 Lyman St., Springfield, Mass.		May 4, 1897
Oastler, William Churchill. Pres., Am. Road Roller Co., 156 Fifth Ave., New York City		Mar. 31, 1891
Odell, Rutledge Irving. Tomkins Cove, N. Y.		Oct. 1, 1895
Olds, William Clarence. Erie, Pa		Nov. 3, 1903
Packard, Ralph Gooding, Jr. Vice-Pres., R. G. Packard Co., 130 Pearl St., New York City		Sept. 3, 1901
Palmer, William Pendleton. Pres., Am. Steel & Wire Co., Western Reserve Bldg., Cleveland, Ohio		Mar. 3, 1896
Parsons, George Wellman. Cons. Engr., The Pennsylvania Steel Co., Steelton, Pa		Sept. 3, 1884
Peverley, Ralph. Flat Iron Bldg., New York City		Dec. 6, 1898
Phillips, Henry Ayling. Archt., 120 Tremont St., Boston, Mass.		April 7, 1886
Phipps, Lawrence Cowle. 1722 Farmers Bank Bldg., Pittsburg, Pa.		Jan. 31, 1899
Pinchot, Gifford. Forester, U. S. Dept. of Agriculture (Res., 1615 Rhode Island Ave.), Washington, D. C.		Mar. 4, 1902
Piper, Alexander Ross. Capt., U. S. A. (*Retired*); 259 Eighty-fifth St., Brooklyn, N. Y.		June 5, 1900
Polk, William Anderson. 42 Hudson St., New York City		May 4, 1897
Pomeroy, Lewis Roberts. Care, Gen. Elec. Co., 44 Broad St., New York City		April 2, 1890
Pratt, Robert James. With Honolulu Iron Works Co., Honolulu, Hawaii		May 4, 1887
Quincy, Charles Frederick. 1175 Old Colony Bldg., Chicago, Ill.		Feb. 4, 1896
Quirk, Eugene McGrath. 698 Boulevard, Ville St. Louis, Montreal, Que., Canada		Feb. 3, 1903
Ransome, Ernest Leslie. Cons. Engr., 11 Broadway, New York City		June 5, 1894
Richardson, Clifford. Director, New York Testing Laboratory, Long Island City, N. Y. (Res., 122 East 34th St., New York City)		Oct. 4, 1892

ASSOCIATES R-W

		Date of Membership.
ROBERTS, WILLIAM. 540 South St., Waltham, Mass.		June 4, 1884
ROGERS, EDWARD ALVERSON. Care, Waring & Gillow, Ltd., 181 Oxford St., London, W., England		Dec. 1, 1896
SAEGER, CHARLES MARSHALL. Gen. Mgr., Coplay Cement Mfg. Co., 1320 Hamilton St., Allentown, Pa.		May 2, 1893
SAPH, AUGUSTUS VALENTINE. Asst. Engr., U. S. Geological Survey, Reno, Nev.		Oct. 1, 1901
SELL, WILLIAM DRUMM. Chf. Engr., Gallego Coal & Land Co., Room 6, Charleston Nat'l Bank Bldg. (P. O. Box 222), Charleston, Kanawha Co., W. Va.	Jun. Assoc.	Dec. 3, 1891 May 2, 1899
SMITH, FRANCIS HOPKINSON. 16 Exchange Pl., New York City		April 5, 1892
SMITH, HERBERT STEARNS SQUIER. Prof. of Applied Mechanics, Princeton Univ., P. O. Box 171, Princeton, N. J.		Sept. 10, 1891
SNARE, FREDERICK. 39 Cortlandt St., New York City		Oct. 6, 1903
SPEED, JAMES BRECKINRIDGE. Pres., Western Cement Assoc., Louisville, Ky.		May 2, 1888
STEARNS, FRED LINCOLN. Dist. Supt. of Street Cleaning, 52 West 126th St., New York City		June 3, 1902
STOUDER, JOHN BURTON. Roadmaster, C. & N. W. Ry., Mason City, Iowa	Jun. Assoc.	Mar. 6, 1900 May 6, 1902
STOWE, CHARLES BROWN. Superior Bldg., Cleveland, Ohio		Oct. 4, 1898
TENNEY, GEORGE OLIVER. Contr., Spartanburg, S. C.	Jun. Assoc.	Sept. 7, 1887 Feb. 5, 1901
THORN, ALFRED WILLIAM. Gen. Mgr., Thorn Cement Co., 112 Church St., Buffalo, N. Y.		Oct. 2, 1900
TOCH, MAXIMILIAN. Chemist for Toch Bros., 468 West Broadway, New York City		Sept. 1, 1903
TOMKINS, CALVIN. 17 Battery Pl., New York City		Jan. 6, 1886
TRAUTWINE, JOHN CRESSON, Jr. 257 South Fourth St., Philadelphia, Pa.		Dec. 5, 1888
TRIEST, WOLFGANG GUSTAV FELIX. V.-P. of The Snare & Triest Co., 39 Cortlandt St., New York City	Jun. Assoc.	Sept. 3, 1890 Mar. 6, 1900
TURRILL, SHERMAN MARSH. With the Rapid Transit Comm., New York City (Res., 223 Schermerhorn St., Brooklyn, N. Y.)		Oct. 1, 1901
UMSTEAD, CHARLES HENRY. Supt. of Constr., U. S. Public Bldgs., Office of the Superv. Archt., U. S. Treasury Dept., Lawrence, Mass.		May 5, 1903
WARDER, JOHN HAINES. Secy., Western Society of Engrs., 1737 Monadnock Blk., Chicago, Ill.		Mar. 7, 1888
WATSON, MERRILL. Mgr., Expanded Metal Eng. Co., 256 Broadway, New York City		Oct. 7, 1902
WEBER, GEORGE ADAM. Secy., The Weber Ry. Joint Mfg. Co., 71 Broadway, New York City		Feb. 6, 1900
WELLS, JOSEPH AGUR. The Fairbanks Co., Broome and Elm Sts., New York City		Jan. 7, 1896

		Date of Membership.
Wilcock, Frederick. 862 Fiftieth St., Brooklyn, N. Y.	Jun. Assoc.	Jan. 7, 1902 Oct. 6, 1903
Wilgus, Herbert Sedgwick. Prin. Asst. Engr., B. H. R. R., 166 Montague St., Brooklyn, N. Y.	Jun. Assoc.	Oct. 1, 1901 Nov. 3, 1903
Willson, Frederick Newton. Prof. of Descriptive Geometry and Technical Drawing, Princeton Univ., Box 63, Princeton, N. J.	Jun. Assoc.	Sept. 5, 1883 Oct. 4, 1892
Young, Charles Griffith. Gen. Supt. of Constr., J. G. White & Co., Inc., 43 Exchange Pl., New York City		Mar. 6, 1894
Zipperlein, Joseph William. Vice-Pres., Wm. G. Hartranft Cement Co., Real Estate Trust Bldg., Philadelphia, Pa.		June 4, 1901

Associates, 127.

JUNIORS.

[Jun. Am. Soc. C. E.]

	Date of Membership.
Adams, Arthur. 132 Oneida St., Utica, N. Y.	Oct. 1, 1901
Adams, Edward Maguire. 1st Lieut., Corps of Engrs., U. S. A., Manila, Philippine Islands	Oct. 7, 1902
Adams, Raymond Edmond. Asst. Civ. Engr., Quartermaster-General's Office, Room 394, State, War & Navy Bldg., Washington, D. C.	May 1, 1900
Adey, John Seager. 445 Lenox Ave., New York City	Feb. 3, 1903
Anthony, Walter Loring. Care, R. H. Tingley Co., 75 Westminster St., Providence, R. I.	Jan. 5, 1904
Armstrong, Alexander Floyd. Asst. Engr. on Manila Sewer System, Office, City Engr., Manila, Philippine Islands	Oct. 7, 1902
Arn, William Godfrey. Asst. Engr., L. & N. R. R., Montgomery, Ala.	Oct. 2, 1900
Baker, Harold James Manning. Surveyman, U. S. E. D., Fort Flagler, Wash.	Oct. 7, 1902
Bamford, William Brokaw. Archt. and Civ. Engr., 1123 Broadway, New York City	June 2, 1903
Barnes, Walter Esmond. 45 Lincoln St., Malden, Mass.	May 6, 1902
Bassett, Robert Jay. 279 Ninety-first St., Chicago, Ill.	Feb. 3, 1903
Baxter, David Elder. 32 West 60th St., New York City	May 2, 1899
Becker, Sylvanus A. Box 732, Connellsville, Pa.	Dec. 1, 1903
Beekman, John Van Derveer, Jr. Care, Purdy & Henderson, 101 Tremont St., Boston, Mass.	Sept. 3, 1901
Belcher, Wallace Edward. Structural Draftsman, Am. Bridge Co., Pencoyd, Pa.	Dec. 2, 1902
Bell, Bertrand Faugères. 120 Liberty St., New York City	June 3, 1902
Belzner, Theodore. Insp., Steel Constr., East Side Viaduct (Section 10, 4th Div.), Rapid Transit R. R. Comm., Home St. and Southern Boulevard, Bronx (Res., 584 Lenox Ave.), New York City	Oct. 5, 1897
Benton, Lewis Steuerwald. Asst. to Engr., M. of W. and Bldgs., Interurban St. Ry. Co., 621 Broadway, New York City	Nov. 5, 1901
Berry, Francis Rigdon. Care, Birmingham Water-Works Co., Birmingham, Ala.	Dec. 2, 1902
Blackwell, Paul Alexander. (With Fort Pitt Bridge Works), Canonsburg, Pa.	Dec. 4, 1900
Blanchard, Arthur Horace. Asst. Prof. of Civ. Eng., Brown Univ., Providence, R. I.	Jan. 2, 1900

	Date of Membership.
Boardman, Howard Edward. Instrumentman, Penn., N. Y. & L. I. R. R. Co., 227 West 33d St., New York City	Oct. 7, 1902
Borland, Bruce. 2027 Prairie Ave., Chicago, Ill.	Mar. 3, 1903
Bouton, George Harold. 89 Danforth Ave., Jersey City, N. J.	May 2, 1899
Bowditch, Ernest W. Landscape Gardener and Civ. Engr., 68 Devonshire St., Boston, Mass.	Feb. 3, 1875
Braslow, Barnett. With Thompson-Starrett Co., 51 Wall St. (Res., 59 East 115th St.), New York City	Nov. 3, 1903
Brisley, Edward Betts. 102 West 75th St., New York City	Dec. 2, 1902
Brown, Collingwood Bruce, Jr. Res. Engr., Canadian Pacific Ry., London, Ont., Canada	Oct. 1, 1901
Brown, William Clinton. Cons. Engr., 512 William St., Montreal, Que., Canada	Sept. 1, 1886
Brush, William Whitlock. Asst. Engr., Dept. of Water Supply, Gas and Electricity, Room 41, Municipal Bldg., Brooklyn, N. Y.	Mar. 3, 1896
Buck, Henry Robinson. Asst. City Engr., P. O. Box 213, Hartford, Conn.	June 5, 1900
Bumsted, Eugene Bradford. Res. Mgr., St. Lawrence River Power Co., St. Lawrence County Elec. & Water Co., Massena, N. Y.	May 1, 1900
Bunnel, William Cyrus. Junior Engr., U. S. Engr. Office, Custom House, Charleston, S. C.	Oct. 1, 1901
Burgoyne, John Henry, Jr. Asst. Engr., M. of W., Buffalo & Susquehanna R. R. Co., Box 331, Galeton, Pa.	Sept. 1, 1903
Burwell, Robert Lemmon. Transitman under S. W. Hayes for Westinghouse, Church, Kerr & Co., 27 Schnirel Bldg., Geneva, N. Y.	Dec. 3, 1901
Cáceres, Simon Novelo. Box 255, National City, Cal.	June 6, 1899
Cameron, John Bobbs. Div. Engr., B. & O. R. R., New Castle, Pa.	Oct. 2, 1900
Cameron, Kenneth Mackenzie. Canadian Niagara Power Co., Niagara Falls, Ont., Canada.	Oct. 6, 1903
Carlin, Joseph Patrick. Care, P. J. Carlin & Co., 26 Court St. (Res., 113 Clinton Ave.), Brooklyn, N. Y	Oct. 4, 1898
Cetti, Carolus Hermann Zane. Fort Worth, Tex.	Feb. 3, 1903
Chadbourn, William Hobbs, Jr. U. S. Asst. Engr., U. S. Engr. Office, Beaver, Pa.	Dec. 3, 1890
Chadbourne, Edward Merriam. Chf. Engr., Albuquerque Traction Co., Albuquerque, N. Mex	Nov. 3, 1903
Clark, John A., Jr. Supt., Distrib. of Public Service, Corporation of N. J. Gas Dept., 260 North Park St., East Orange, N. J.	Aug. 31, 1897
Clark, William George. Civ. and Cons. Engr., 1042 Spitzer Bldg., Toledo, Ohio	April 4, 1888
Clarke, St. John. Bogota, N. J.	Sept. 5, 1888
Class, Charles Frank. Asst. Engr., Am. Coke & Gas Constr. Co., Camden, N. J. (Res., 2610 N. Jessup St., Philadelphia, Pa)	Mar. 3, 1903
Clausnitzer, John. Engr. Insp., Bureau of Highways, Municipal Bldg., Brooklyn, N. Y.	Mar. 3, 1903
Cleaver, Pitson Jay. 445 Fifty-fifth St., Brooklyn, N. Y.	April 4, 1899
Cobb, Samuel Allen. City Engr., Muskogee, Ind. T.	June 3, 1902

	Date of Membership.
Codwise, Henry Rogers. Instr. in Eng., Poly. Inst. of Brooklyn and Instr. in Eng. Field Work and Math., Cooper Union Schools of Science and Art, New York City	April 2, 1901
Conrow, Herman. Asst. Engr., Dept. of Docks and Ferries, Pier A, New York City	May 3, 1898
Cooper, Kenneth Farra. Transitman, Bay Cities Water Co., Smith Creek, *via* San José, Cal	Oct. 6, 1903
Cornell, John Nelson Hayward. 312 Manhattan Ave., New York City	May 1, 1889
Corrigan, George Washington. Div. Engr., St. L., I. M. & S. Ry., Self, Boone Co., Ark	Feb. 5, 1901
Cotton, Miles Penner. Asst. Engr., Constr. Dept., C. P. Ry., Winnipeg, Man., Canada	Oct. 6, 1903
Crane, Will Edwin. 18 Broadway, Room 803, New York City	May 1, 1889
Crawford, Joseph Emmanuel. 706 Campbell Ave., Roanoke, Va	Dec. 5, 1899
Crook, John Anthony. Chf. Engr. for The John Gilligan Co. (also City Engr.), Falls City, Nebr	Feb. 3, 1903
Culgin, Guy Whitmore. Engr. and Gen. Contr. (Culgin & Pace), 133 West 129th St., New York City	Mar. 6, 1900
Darrow, Marius Schoonmaker. Asst. Engr., Bridge Dept. of C., B. & Q. Ry., 209 Adams St., Room 62, Chicago, Ill	Feb. 6, 1900
Davis, George Jacob, Jr. Hydr. and San. Engr., Atlanta, Ga	Nov. 4, 1902
Day, Arthur Mortimer. New York Athletic Club, 59th St. and 6th Ave., New York City	May 1, 1900
de la Mora, Manuel. Civ. Engr. and Archt., 17½ Sn. Francisco St., Guadalajara, Jalisco, Mexico	Dec. 28, 1900
Diamant, Arthur Herbert. Asst. to Div. Engr., Aqueduct Div., Aqueduct Commrs. (Res., 4 East 97th St.), New York City	May 5, 1903
Dimond, James Renwick. 128 West 33d St., New York City	Sept. 3, 1901
Dixon, De Forest Halsted. 166 Remsen St., Brooklyn, N. Y	May 3, 1898
Doty, John Williams. Care, Foundation & Contr. Co., 35 Nassau St., New York City	Nov. 3, 1903
Dougan, James. Asst. Engr. with Clinton & Russell, 32 Liberty St., New York City	Mar. 5, 1901
Dougherty, Richard Erwin. Asst. Engr., Constr. Dept., N. Y. C. & H. R. R. R., Albany, N. Y. (Res., 244 West 20th St., New York City)	Jan. 6, 1903
Duller, David Mark. Lake Charles, La	Oct. 6, 1903
Dunnells, Clifford George. Contr. Agt., Am. Bridge Co., 826 Frick Bldg., Pittsburg, Pa	Feb. 4, 1902
Dusenberry, Walter Lorton. 220 Tenth St., South Brooklyn, N. Y.	Nov. 5, 1890
Edwards, Oliver Cromwell, Jr. Asst. Engr. in Chg. of Ohio River Bridge, Wabash R. R., Mingo Junction; Address, 508 N. 5th St., Steubenville, Ohio	Oct. 7, 1902
Ely, John Andrews, Jr. 21 East 55th St., New York City	April 30, 1901
Enos, George Wallace. 27 William St., New York City	Mar. 6, 1900

	Date of Membership.
Enzian, Charles. Dist. Engr., L. V. Coal Co., Lock Box 281, Wilkesbarre, Pa.	Sept. 3, 1901
Falk, Myron Samuel. Instr., Dept., Civ. Eng., Columbia Univ. (Res., 44 West 53d St.), New York City	Feb. 4, 1902
Faucette, William Dollison. Asst. Engr., S. A. L. Ry., Union Station Bldg., Savannah, Ga.	Jan. 6, 1903
Fernow, Rossiter Raymond. Asst. Engr., Board of Public Works, 1427 North Front St., Harrisburg, Pa.	Mar. 3, 1903
Firth, Elmer Wallace. Dept. of Sewers (Res., 473 Fourteenth St.), Brooklyn, N. Y.	Jan. 7, 1896
Fischer, Guillermo Gustavo. 1534 I. St., N. W., Washington, D. C.	Feb. 2, 1904
Fisher, Wager. Contr. Engr., 1420 Chestnut St., Philadelphia, Pa.	Oct. 3, 1899
Forbes, Henry de Bretton. West Haven, Conn.	Dec. 4, 1900
Foss, John Harrison. With Hamakua Ditch Co., Huelo, Maui, Hawaii	Dec. 1, 1903
Fox, Charles Louis. Asst. Engr., Pennsylvania Water Co., 701 Wood St., Wilkinsburg, Pa.	May 5, 1903
Fujino, Shukichi. Nippon Tetsudo Kwaisha, Tokyo, Japan	Feb. 3, 1903
Furman, Job Rockfield. Engr., Otis Elevator Co., 71 Broadway, New York City	July 2, 1890
Gast, E. Albert. Draftsman, Office of Chf. Engr., "Commrs. of Water-Works," Cincinnati, Ohio	Oct. 6, 1903
Gay, Robert Walter. Superv.'s Office, L. I. R. R., Jamaica, N. Y.	Oct. 6, 1903
George, Hugh Melvin. 195 Eighth St., Troy, N. Y.	Feb. 3, 1903
Getchell, William Stewart. Asst. Engr., C. F. & I. Co., 816 Boston Bldg., Denver, Colo.	Sept. 2, 1902
Gilman, Charles Edward. Asst. Engr., Bay Cities Water Co., 10th Floor, Mutual Savings Bank Bldg., San Francisco, Cal.	Oct. 6, 1903
Goodrich, Ernest Payson. Chf. Engr., Bush Cos., 117 Pearl St., New York City	April 3, 1900
Goodridge, John Wesley. Asst. Engr., Rapid Transit R. R. Commrs., 5th Div., New York City (Res., 292 Marlborough Rd., Brooklyn, N. Y.)	Oct. 4, 1898
Gordon, John Blake. 6 Cooke Pl., N. W., Washington, D. C.	Dec. 1, 1903
Gould, John Warren Du Bois. Bay Cities Water Co., Smith Creek Hotel, Mt. Hamilton, Cal.	Oct. 7, 1902
Graves, Willard Franklin. Asst. Engr., So. Side Elev. R. R. Co., 450 Thirty-seventh Pl., Chicago, Ill.	Oct. 31, 1899
Gray, John Colin. Asst. Engr., Bureau of Highways, Room 19, Municipal Bldg., Brooklyn, N. Y.	June 4, 1901
Grimm, Henry England. 3213 Eads Ave., St. Louis, Mo.	Oct. 2, 1900
Griswold, Harry Todd. Old Lyme, Conn.	Oct. 6, 1903
Haehl, Harry Lewis. Asst. Engr., Bay Cities Water Co., Coyote, Santa Clara Co., Cal.	Oct. 6, 1903

	Date of Membership.
Hall, Charles Ward. 140 Nassau St., New York City	Sept. 6, 1898
Hall, Frederic Francis. Civ. and Min. Engr., 2335 Warring St., Berkeley, Cal	June 5, 1900
Hall, Martin Welch. Bureau of Sewers, Borough of the Bronx, New York City	Oct. 1, 1901
Hamill, Alexander, Jr. Jersey City, N. J	Dec. 28, 1900
Hamlin, Ralph. Structural Designer, International Paper Co., 30 Broad St., New York City	Jan. 5, 1904
Hammer, Robert Henry. 205 Congress St., Brooklyn, N. Y..	Jan. 7, 1902
Hancock, Henry Sydney, Jr. Transitman on Location, Grand Trunk Pacific Ry., 627 Cooper St., Camden, N. J	Oct. 6, 1903
Haney, Lewis Tustler. Church and Utica Avenues, Brooklyn, N. Y.	Oct. 7, 1902
Hanna, Walter Scott. The Am. Pipe Mfg. Co., 112 North Broad St., Philadelphia, Pa	Oct. 6, 1903
Harding, William Stewart. Bituminous Coal Operator, Arcade Bldg. (Res., 3411 Hamilton St.), Philadelphia, Pa	Nov. 3, 1896
Harps, Harry Macy. Asst. Engr., Care, Gen. Agt., C. G. W. Ry., Kansas City, Mo	Mar. 3, 1903
Harrington, Francis Burchard. Asst. Supt. of Signals, Mohawk Div., N. Y. C. & H. R. R. R. Co., 93 Ten Broeck St., Albany, N. Y	Sept. 11, 1900
Harrington, Harry Garfield. Asst., Eng. Dept., The New Jersey Zinc Co., 71 Broadway, New York City	Jan. 7, 1902
Harris, Henry Alexander. 245 Nassau St., Princeton, N. J	Oct. 31, 1899
Harshbarger, Elmer Dwight. Res. Engr., C. & E. I. R. R., Ogden, Ill	Nov. 5, 1901
Harwi, Solomon Jacob. Civ. Engr. for The Babcock & Wilcox Co., New York City (Res., 910 Ave. C, Bayonne, N. J.)	Dec. 4, 1889
Hausman, Frederick Appel. 514 Union St., Allentown, Pa.	Feb. 3, 1903
Hawks, Archie McLean. Cons. Engr., 402 Berlin Bldg., Tacoma, Wash	Nov. 2, 1887
Hayden, Edwin Clapp. 16 City Sq., Room 4, Charlestown, Mass	Oct. 1, 1901
Heald, Edward Creswell. 1720 N St., Washington, D. C	Oct. 7, 1902
Henley, Robert Dwiggins Monteith. Asst. Engr., L. & N. R. R., Pensacola, Fla	Sept. 3, 1901
Higginson, Jonathan Yates. 44 Union Sq. East, New York City	Oct. 1, 1901
Hill, Stirling Bryant. 1633 Bellevue Ave., Seattle, Wash	Oct. 7, 1902
Holliday, Alexander Rieman. Asst. Engr., Penn. Co., Union Station, Chicago, Ill	Oct. 7, 1902
Holmes, Edwin Merritt. Engr., Spanish Am. Iron Co., Daiquiri, Cuba	Mar. 31, 1903
Hopkins, George Gallagher, Jr. Insp. for the N. Y. Board of Fire Underwriters; Address, 350 Washington Ave., Brooklyn, N. Y.	Jan. 5, 1904
Hopper, John Jacob. Civ. Engr. and Contr., 215 West 125th St., New York City	May 5, 1886
Horton, Albert Howard. Asst. Engr., U. S. Geological Survey, Washington, D. C	June 3, 1902
Horton, Sandford. 305 W. Vermont St., Indianapolis, Ind	Feb. 7, 1877

Date of Membership.

How, Richard Willis. Asst. Engr., Steel Erection, Atlantic Ave. Impvt., 44 Court St., Brooklyn, N. Y. .... June 6, 1899

Howard, Ernest Emmanuel. Res. Engr. of Bridges, Ferrocarril Veracruz al Pacifico (Waddell & Hedrick, Cons. Engrs.), Apartado 18, Cordoba, V. C., Mexico .... Dec. 3, 1901

Howe, Charles Edward. With The Wabash Screen Door Co., Minneapolis, Minn .... Mar. 6, 1900

Howes, Ralph Holt. 36 East 28th St., New York City .... Feb. 2, 1904

Hoyt, Henry Perez. Asst. Engr., Great Northern Paper Co., Millinocket, Me .... Oct. 6, 1903

Hulse, Shirley Clarke. Taughannock Falls, N. Y .... Oct. 7, 1902

Hyatt, Caleb. Scarsdale, Westchester Co., N. Y .... Mar. 3, 1903

Ireland, Mark Lorin. Mech. Draftsman, Ordnance Office, War Dept., Washington, D. C .... Oct. 6, 1903

Ives, Howard Chapin. Asst. Prof. of Civ. Eng., Univ. of Pennsylvania, Philadelphia, Pa .... Dec. 3, 1901

Jabelonsky, Carl Hugo. Engr., J. B. & J. M. Cornell Co. Iron Works, 26th St. and 11th Ave., New York City .... Sept. 1, 1903

Jordan, Willis Robert. Bangor, Pa .... Oct. 6, 1903

Kast, Clarke Nightingale. Asst. Engr., Rock Island System, Little Rock, Ark .... June 4, 1901

Kauffman, Vernet Albert. Transitman, Denver, N. W. & Pac. Ry.; Address, Care, H. A. Sumner, Chf. Engr., Denver, Colo .... Feb. 3, 1903

Kelly, Olaf Morrogh. Asst. Engr., Williamsburg Bridge, 84 Broadway, Brooklyn, N. Y .... Dec. 6, 1898

Kempkey, Augustus, Jr. 980 Sixth Ave., Oakland, Alameda Co., Cal. Mar. 31, 1903

Kibbe, Augustus Sayre. Chf. Engr., The Am. Rys. Co., 905 Witherspoon Bldg., Philadelphia, Pa .... Mar. 6, 1889

Kimball, Ralph Charles. Address unknown .... Oct. 7, 1902

Kolb, Henry Jacob. Terminal Engr.'s Office, N. Y. C. & H. R. R. R., 110 East 50th St., New York City .... Feb. 3, 1903

Lambie, Charles Sumner. 7 Cliff St., Pittsburg, Pa .... Oct. 1, 1901

Lant, Frank Parsons. 21 Park Row, Room 1838, New York City .... Oct. 3, 1888

Layng, Frank Rahn Shunk. Asst. Engr., Bessemer & Lake Erie R. R., Greenville, Pa .... April 1, 1902

Leake, Boudinot Gage. Gen. Office, C., R. I. & G. Ry., Fort Worth, Tex .... Jan. 5, 1904

Lee, George William. Engr. for Sundstrom & Stratton, R. R. Contrs., 143 Liberty St., New York City .... Mar. 4, 1902

Lillich, Joseph Thomas. With W. Wollastan Guest, Cons. Engr., 420 Rialto Bldg., St. Louis, Mo .... Nov. 3, 1903

Lindsey, Kieffer. Box 74, Station W, Brooklyn, N. Y .... Oct. 7, 1902

	Date of Membership.
MacCracken, George Gere. University Heights, New York City	Feb. 5, 1901
Macdonald, Archibald Angus. 32 Liberty St., New York City	June 4, 1901
Machen, Henry Bennett. Asst. Engr., Rapid Transit R. R. Comm., (Res., 315 West 95th St.), New York City	May 2, 1899
McBurney, Henry. 1409 Locust St., Philadelphia, Pa	Jan. 5, 1904
McCrory, Sol. Contr. and Designing Engr. with O. O. Alexander, Railroad, Highway and Elec. Ry. Bridges, 511 K. C. Life Bldg., Kansas City, Mo	Oct. 6, 1903
McCulloch, Robert Austen. Archt., 51 Chambers St., New York City (Res., 80 Hillside Ave., Orange, N. J.)	Sept. 2, 1902
McDonald, Harry Peake, Jr. Asst. Supt., Care, The Snead & Co. Iron Works, Ft. of Pine St., Jersey City, N. J	Oct. 7, 1902
McHarg, Leslie. 159 Madison Ave., New York City	Mar. 5, 1901
McKeever, William. Address unknown	Jan. 2, 1900
Madden, John Henry. Asst. Engr., Rapid Transit R. R. Comm., 308 West 30th St., New York City	Oct. 7, 1902
Mansfield, Royal John. Asst. Engr., Riter Conly Mfg. Co., 7724 Hamilton Ave., Pittsburg, Pa	Dec. 2, 1902
Matheson, John Douglas. Insp. of New Constr., N. Y. C. & H. R. R. R. Co., Terminal Engr.'s Office, 110 East 50th St., New York City	Mar. 3, 1903
Melick, Neal Albert. 23 East 48th St., New York City	Dec. 2, 1902
Melius, Ludlow Lawrence. 30 South Hawk St., Albany, N. Y	May 2, 1899
Merriman, Thaddeus. Asst. Engr., Jersey City Water Supply Co., Boonton, N. J	April 4, 1899
Merz, Leon. 1730 Memorial Ave., Philadelphia, Pa	Mar. 5, 1901
Meyers, Clarence William. 314 Riverside Drive, New York City	Sept. 1, 1903
Millard, Curtiss. Pres. and Gen. Mgr., Peoria & Pekin Union Ry., Peoria, Ill	April 3, 1889
Miller, Stanley Alfred. Care, H. W. Edwards, Ingeniero en Jefe, Ferrocarril Chihuahua al Pacifico, Chihuahua, Chih., Mexico	Feb. 4, 1902
Miner, James Henry. Engr. Dept., National Transit Co., Oil City, Pa.	Mar. 31, 1903
Minor, Edward Eastman. 493 Edgewood Ave., New Haven, Conn	May 1, 1900
Moore, Egbert Jessup. Box 161, Royersford, Pa	Mar. 31, 1903
More, Charles Church. U. S. Engr. Office, Fort Worden, Port Townsend, Wash	May 2, 1899
Morphy, Luis Gonzaga. Asst. Engr., N. Y. C. & H. R. R. R. Co., Room 517, Grand Central Station, New York City	Feb. 4, 1902
Murray, Ray. Asst. to Chf. Engr., Am. Bridge Co. of N. Y., 3724 Main St., Wissahickon, Philadelphia, Pa	Oct. 6, 1903
Myers, Chester John. Care, Water Dept., Atlantic City, N. J	Oct. 1, 1901
Nelson, Alexander Howard. 200 Lewis Bldg., Pittsburg, Pa	Nov. 1, 1898
Nutter, Charles Herbert. Asst. Engr., Manhattan Ry. Co. (Res., 101 West 116th St.), New York City	Feb. 5, 1901
Nye, Algernon Sidney. Asst. Engr. to the Aqueduct Commrs., Kingsbridge, New York City	July 2, 1890

	Date of Membership.
Oakley, George Israel. Rapid Transit Subway Constr. Co., 1913 Amsterdam Ave., New York City	Oct. 6, 1903
Ortiz, Eduardo. Calle del Coliseo Viejo No. 6, P. O. Box 2020, City of Mexico, Mexico	Nov. 4, 1902
Paine, George Hebard. Cons. Engr., *The Railway Age,* 150 Nassau St., New York City	Nov. 5, 1890
Paraschos, George Theophanes. Care, L. & N. R. R. Co., Ridgetop, Tenn	Nov. 4, 1902
Parker, Asa Warren. Second Ave. and 67th St., Brooklyn, N. Y.	Sept. 11, 1900
Parker, Richard Denny. Office Engr., H. & T. C. R. R., Room 19, Grand Central Depot, Houston, Tex	June 3, 1902
Pearse, Langdon. Asst. San. Engr., The Augusta Water Dist., Box 203, Augusta, Me	Jan. 6, 1903
Pillet, Frederick Fischer. Asst. Engr., Board of Public Works, City Hall, Mobile, Ala	June 2, 1903
Pistor, George Emil John. 518 Broad St., Newark, N. J	Dec. 3, 1901
Plogsted, Walter John. Yale, Okla	Oct. 6, 1903
Polk, Armour Cantrell. P., N. Y. & L. I. R. R. Co., East River Tunnel, 20 West 34th St., New York City	Oct. 6, 1903
Porter, John Endicott. Draftsman, N. Y. C. & H. R. R. R., Vilas, Pa	Sept. 1, 1903
Potts, Clyde. U. S. Junior Engr., 33 Campau Bldg., Detroit, Mich.	Dec. 3, 1901
Price, Philip Wallis. Asst. Engr., Yakima Development Co., North Yakima, Wash	April 2, 1901
Proctor, Ralph Fenno. 902 Whitehall Bldg., Battery Pl., New York City	June 3, 1902
Quanz, Rudolph. Rodman, Penn., N. Y. & L. I. R. R. Co., 227 West 33d St., New York City (Res., 40 Howard Ave., Brooklyn, N. Y.).	Sept. 2, 1902
Raster, Walther. With E. C. & R. M. Shankland, The Rookery, Chicago, Ill	Feb. 4, 1902
Ray, David Heydorn. Archt. and Engr., 555 West 182d St., New York City	Oct. 7, 1902
Raynor, Clarence Webster. First Asst. Engr., The Midland Bridge Co., Kansas City, Mo	Feb. 4, 1902
Reed, William Belden, Jr. Gen. Mgr., White Mfg. Co., 556 West 34th St., New York City	Dec. 1, 1896
Rhea, William Douglas. Mgr., National Fertilizer Co., Nashville, Tenn	Oct. 4, 1898
Rhett, Edmund Moore. 3453 Woodlawn Ave., Philadelphia, Pa	Nov. 4, 1902
Richardson, Clinton Leroy. 544 Equitable Bldg., Atlanta, Ga	Sept. 2, 1902
Richardson, John Francis. First Asst. Engr., Water, Sewerage and Water Board, 602 Carondelet St., New Orleans, La	Oct. 3, 1899
Riedel, Arthur Emil. Abendroth & Root Mfg. Co., 99 John St., New York City	Nov. 5, 1901
Robb, Louis Adams. 71 Lincoln Park, Newark, N. J	May 5, 1903

	Date of Membership.
Rohnert, Benno. U. S. Asst. Engr., Amherstburg, Ont., Canada	April 3, 1889
Runyon, William Kerper. Care, Am. China Development Co., Canton, China	April 5, 1898
Ryan, Michael Healey. Asst. Engr., N. Y. Rapid Transit Comm., 231 West 125th St., New York City	Dec. 3, 1901
Ryder, Ely Morgan Talcott. 40 Whalley Ave., New Haven, Conn	Jan. 5, 1897
Sabin, Ralph Harvey. Pomfret, Conn	Oct. 7, 1902
Sauer, Alfred Francis. Draftsman, C. R. R. of N. J., New York City (Res., 1158 East Jersey St., Elizabeth, N. J.)	Sept. 1, 1903
Sawyer, Wilbur Cyrus. Eng. Aid, U. S. Geological Survey, Washington, D. C	Oct. 6, 1903
Sayers, Edward Lawrence. Care, P., N. Y. & L. I. R. R., 20 West 34th St., New York City	Feb. 2, 1904
Schmid, Francis Rauch. Draftsman, The Am. Bridge Co. of N. Y., 30 Wall St., Bethlehem, Pa	Oct. 6, 1903
Schmitt, Jacob. Bureau of Highways, Municipal Bldg., Brooklyn, N. Y	June 2, 1903
Schoder, Ernest William. 410 E. Yates St., Ithaca, N. Y	Oct. 1, 1901
Schumann, Carl Julius. With The United Eng. & Contr. Co., 13 Park Row, New York City	Dec. 2, 1902
Scott, Guy. Asst. Engr., M. of W., Indianapolis Div., Penn. Lines W. of Pitts., Union Station, Columbus, Ohio	Dec. 1, 1903
Seabury, George Tilley. Asst. Engr. with The O'Rourke Eng. Constr. Co., 129 West 83d St., New York City	Mar. 31, 1903
Selby, Oscar Ellsworth. Asst. Engr., C., C., C. & St. L. Ry., Cincinnati, Ohio	Mar. 4, 1891
Senior, Frank Sears. With Arthur McMullen & Co., Ohio River Bridge, Mingo Junction, Ohio	Feb. 28, 1899
Sherwood, Frederick Augustus. Apartado 2522, City of Mexico, Mexico	Oct. 6, 1903
Shire, Moses Edmund. Engr. in Chg., Chicago Union Transfer Ry. Co., 1618 Tribune Bldg., Chicago, Ill	April 2, 1901
Shryock, Joseph Grundy. Eng. Dept., Virginia Bridge & Iron Co., Roanoke, Va	April 2, 1901
Sinnickson, George Rosengarten. Supervisor, P. R. R. Co., Dravosburg, Allegheny Co., Pa	Sept. 5, 1899
Small, James Hampden, Jr. Asst. Engr., Ryan & Parker Constr. Co., 631 West 138th St., New York City	Mar. 31, 1903
Smith, Charles Horton. City Engr., Room 5, Times Bldg., Middletown, N. Y	June 4, 1890
Smith, George Edson Philip. Prof. of Eng., Univ. of Arizona, Tucson, Ariz	Feb. 3, 1903
Smith, Marion deKalb, Jr. 6 Washington Ave., Chestertown, Md	Oct. 1, 1901
Smith, Merritt Haviland. Engr., Finance Dept., 280 Broadway, Room 52, New York City (Res., 1 Overlook Terrace, Yonkers, N. Y.)	June 5, 1889

	Date of Membership.
Smith, Travis Logan, Jr. Chf. Engr., Brazos Canal Co., Gaston, Ft. Bend Co., Tex.	Feb. 3, 1903
Snyder, Charles Herman. Draftsman, The Solvay Process Co. (Res., 705 Willis Ave.), Syracuse, N. Y.	Oct. 7, 1902
Speidel, Hugo S. Pres., The David Henry Bldg. Co., cor. Main and Smith Sts., Paterson, N. J.	Feb. 5, 1890
Spencer, Louis Bernard. Cons. Engr., Box 487, Ogden, Utah	Oct. 31, 1899
Starr, William H. Supt., Chattanooga Div., Queen & Crescent R. R., Somerset, Ky.	April 2, 1884
Stepath, Charles Underhill. 154 West 122d St., New York City	Feb. 3, 1903
Stewart, William James. First Asst. City Engr., Rochester, N. Y.	May 7, 1890
Stiger, John Sharp, Jr. Bernardsville, N. J.	Oct. 2, 1900
Stratton, Charles Heywood. Sub-Insp., Dept. of Bldgs. and Grounds, U. S. Naval Academy, 195 Hanover St., Annapolis, Md.	Oct. 6, 1903
Sussex, James Wolfe. Asst. Engr. with Alexander Potter, Cons. Engr., New York City; Address, Y. M. C. A. Bldg., Newark, N. J.	Oct. 6, 1903
Swaty, David Youngs. Asst. Engr., Penn. Lines W. of Pitts., Union Station, Pittsburg, Pa.	Oct. 6, 1903
Swindells, Joseph Springer. San., Hydr. and Const. Engr., 4 West 14th St., Room 3, New York City	Feb. 2, 1897
Taft, Jesse Russell. Asst. Engr., N. Y. C. & H. R. R. R., Res. Engr.'s Office, Albany, N. Y.	June 2, 1903
Tappan, Roger. Care, Baring Bros. & Co., Ltd., 8 Bishopsgate St., Within, London, E. C., England	Dec. 3, 1884
Tatlock, James Lloyd. Asst. Engr., Sewer Comm., City Hall, New Rochelle, N. Y.	Sept. 1, 1903
Taylor, Alexander Jenifer. Park Engr., 900 Adams St., Wilmington, Del.	Oct. 3, 1899
Taylor, Howard Flanders. Res. Engr., Gasconade Ry. Constr. Co., Eldon, Mo.	Feb. 28, 1899
Taylor, Norman Alfred. Asst. City Engr., 603 Grand St., Troy, N. Y.	Oct. 6, 1903
Taylor, William Purves. Engr. in Chg. of Philadelphia Municipal Testing Laboratories, 318 City Hall, Philadelphia, Pa.	Oct. 7, 1902
Thompson, Wilford Ashford. Civ. and San. Engr., 412 Fullerton Bldg. (Res., 4859 Fountain Ave.), St. Louis, Mo.	Oct. 1, 1901
Tilt, Garret Edward. 688 E. 25th St., Paterson, N. J.	April 4, 1899
Toensfeldt, Hans Carl Thomas. Asst. Engr. with Brenneke & Fay, Cons. Engrs., St. Louis, Mo.	April 1, 1902
Tombo, Carl. M. of W. Dept., N. Y. C. & H. R. R. R. (Res., 273 West 138th St.), New York City	Feb. 3, 1903
Towne, Joseph Minott. Gen. Agt., Safety Car Heating & Lighting Co., 160 Broadway, New York City	Dec. 5, 1899
True, Albert Lyman. Fort Williams, Cape Cottage, Me.	Sept. 2, 1902
Tunstall, Whitmell Pugh. Care, Div. Engr., M. of W., B. & O. R. R., Cleveland, Ohio	Oct. 6, 1903

	Date of Membership.
Ullmann, John George. 26 Stewart Ave., Buffalo, N. Y.	April 1, 1902
Underwood, Howard Warren. Asst. Engr. in Chg. of Upper and Lower Roxborough Filter Stations, Philadelphia, Pa.	Dec. 3, 1901
Van Brakle, John Ogden. 2626 Broadway, New York City	Mar. 5, 1901
Van Zile, Harry Lee. 410 West End Ave., New York City	Jan. 6, 1886
Veuve, Erle Leroy. Asst. Engr., Pacific Elec. Ry. Co., cor. Kohler and Wilde Sts., Los Angeles, Cal.	Sept. 3, 1901
Wachter, Charles Lucas. Const. Engr., Cableway Dept., Lidgerwood Mfg. Co., 96 Liberty St., New York City	June 3, 1902
Walker, Edward Lloyd. 521 Austell Bldg., Atlanta, Ga.	Feb. 3, 1903
Walters, Henry Radclyffe St. Arvans. Engr. and Chf. Draftsman, The Guerber Eng. Co., (211 S. New St.), Bethlehem, Pa.	Oct. 6, 1903
Ward, Charles Royce. 420 West 118th St., New York City	Dec. 1, 1896
Warner, George Littleton. 1522 Kingman Pl., N. W., Washington, D. C.	April 1, 1902
Waugh, William Hammond. Greenville, Pa.	Oct. 1, 1901
Weaver, Frank Maurice. 1813 North 15th St., Philadelphia, Pa.	Nov. 4, 1902
Webster, Royal Sylvester. Care, H. W. Edwards, Chf. Engr., Chihuahua & Pacific Ry., Apartado 46, Chihuahua, Mexico	Oct. 6, 1903
Weller, Francis Repetti. Associated with Henry A. Pressey, Civ. and Hydr. Engr., 1416 F St., N. W., Washington, D. C.	Feb. 5, 1901
Wells, Clinton Glencairn. City Engr., Galveston, Tex.; Chf. Engr., Mena (Ark.) Min. & Metal Co.; Address, Galveston, Tex.	Mar. 5, 1901
Welton, Benjamin Franklin. Examining Engr., Commrs. of Accounts, New York City (Res., 1 Wiener Pl., Tompkinsville, N. Y.)	April 6, 1897
Wenige, Arthur Emil. Care, Bureau of Eng., Finance Dept., 280 Broadway, New York City	May 6, 1902
White, Frank George. Office of City Engr., Salt Lake City, Utah	Dec. 3, 1901
Whitman, Ezra Bailey. (Williams & Whitman), 902 Whitehall Bldg., Battery Pl., New York City	Feb. 3, 1903
Whitney, Thomas Bryan, Jr. Care, Met. St. Ry. Co., New York City.	Sept. 6, 1898
Whitson, Abraham Underhill. Transitman, Croton Aqueduct Dept., Croton-on-Hudson, R. F. D., N. Y.	Jan. 7, 1902
Whitted, Levi Romulus. Draftsman in Chg., Dept. of Yards and Docks, Navy Yard, Charleston, S. C.	Mar. 6, 1900
Wickersham, John Hough. Asst. Supt., Hudson Impvt. Co., 5 West 34th St., New York City	May 6, 1902
Widdicombe, Robert Alexander. Engr. and Supt., Kroeschell Bros. Co., 1651 Roscoe St., Chicago, Ill.	April 2, 1901
Wilcox, Clark Luzerne. Asst. Engr., Waring, Chapman & Farquhar, 874 Broadway, New York City	Dec. 3, 1901
Wild, Herbert Joseph. Asst. to Supt. of Constr., U. S. Life Saving Service, 721 Broad St., Meriden, Conn.	Mar. 31, 1903

	Date of Membership.
Wildes, Waldo Gilman. Div. Engr.'s Office, Weighlock Bldg., Syracuse, N. Y.	Feb. 3, 1903
Wilhelm, Jerome Frederick. Traverse City, Mich.	Jan. 2, 1900
Williams, Benjamin Lee, Jr. Supt., The West Orange Water Co., 323 Valley Rd., West Orange, N. J.	Feb. 3, 1903
Williams, Howard Shay. 401 Clinton Ave., Brooklyn, N. Y.	Dec. 1, 1903
Williams, Roger Butler, Jr. (Williams & Whitman), 902 Whitehall Bldg., Battery Pl., New York City	Oct. 1, 1901
Wilson, William Edward. Asst. Prof. of Civ. Eng., Univ. of Utah, Salt Lake City, Utah	Jan. 6, 1903
Winchester, Philip Harold. Asst. Engr., R., W. & O. Div., N. Y. C. & H. R. R. R. (Res., 37 Ten Eyck St.), Watertown, N. Y.	Jan. 7, 1902
Woodcock, Henry Wright. Asst. Insp., B. H. R. R. Co., 2431 Church Ave., Brooklyn, N. Y.	Dec. 1, 1903
Woollard, George Clifton. Engr. and Supt., James Stewart & Co., 30 Elizabeth St., Hornellsville, N. Y.	April 3, 1900
Wyckoff, Charles Rapelyea, Jr. Instr., Coll. of Civ. Eng., Cornell Univ.; Res., 185 Penn St., Brooklyn, N. Y.	May 5, 1903
Zabriskie, Aaron J. 23 Fifth Ave., New York City	July 1, 1885

Juniors, 298.

FELLOWS.

[F. Am. Soc. C. E.]

	Date of Membership.
Adams, Edward Dean. Banker, 35 Wall St., New York City	Mar. 31, 1891
Ainslie, James W. Care, F. H. Vaughan, 207 East College St., Louisville, Ky	May 28, 1872
Albright, John Joseph. Buffalo, N. Y	April 20, 1886
Barber, Amzi Lorenzo. Belmont, Washington, D. C	Mar.. 19, 1886
Belknap, William Richardson. 115 West Main St., Louisville, Ky..	May 28, 1872
Blatchford, Eliphalet W. 375 La Salle Ave., Chicago, Ill.	Feb. 6, 1873
Bouton, Nathaniel S. Care, Kenwood Bridge Co., 614 First National Bank Bldg., Chicago, Ill	Dec. 30, 1872
CHANUTE, OCTAVE. (*Past-President*). Cons. Engr., 413 East Huron St., Chicago, Ill.	M. Feb. 19, 1868 F. July 11, 1872
Clark, Edward White. Bullitt Bldg., Philadelphia, Pa.	April 8, 1870
Coit, Edward Woolsey. Address unknown	Sept. 20, 1872
Coleman, Thomas Cooper. 252 West Main St., Louisville, Ky.	May 28, 1872
Cooper, Edward. 17 Burling Slip, New York City	Dec. 10, 1885
Darwin, Harry Gilbert. Supt., Tenement House Dept. of City of New York, 321 West 79th St., New York City	Mar. 2, 1887
du Pont, Biderman. Louisville, Ky.	Sept. 5, 1873
Everest, Charles Marvin. 506 West Ave., Rochester, N. Y.	Nov. 1, 1892
Farren, B. N. Montague City, Mass	Mar. 12, 1870
Flint, Charles R. Flint & Co., 30 Broad St. (Res., 4 East 36th St.), New York City	June 7, 1876
Green, Samuel Magee. R. R. Contr., 740 Wells Bldg., Milwaukee, Wis.	Sept. 5, 1888
Hill, James Jerome. Pres., G. N. Ry. Co., St. Paul, Minn	Jan. 10, 1889
Holman, Stephen. 150 Atlantic Ave., Swampscott, Mass.	June 29, 1872
Kiddle, Alfred Watts. 314 West 98th St., New York City	Oct. 3, 1893

	Date of Membership.
Merritt, George. Address unknown	May 6, 1870
Meyer, Henry Coddington. Montclair, N. J	Oct. 22, 1885
Richmond, Henry A. Cor. Delaware and Tupper Sts., Buffalo, N. Y.	July 7, 1870
Rumsey, B. C. Buffalo, N. Y	May 12, 1870
Stanton, John Robert. 11 William St., New York City	April 4, 1899
Walker, George Clarke. 228 Michigan Ave., Chicago, Ill	Feb. 6, 1873
Watson, James. Paterson, N. J	Dec. 5, 1872
Welton, Nelson James. Waterbury, Conn	Jan. 20, 1873

Fellows (not Members), 28.

CLASSIFIED SUMMARY OF MEMBERSHIP, FEBRUARY 10th, 1904.

Honorary Members	9
Corresponding Members	2
Members	1 670
Associate Members	820
Associates	127
Juniors	298
Fellows (not Members)	28
Total	2 954

GEOGRAPHICAL LIST.

NORTH AMERICA.

CANADA. Total Membership, 67.

Members.—***Almonte, Ont.***—A. Bell. ***Amherstburg, Ont.***—C. Y. Dixon. ***Berlin, Ont.***—W. H. Breithaupt. ***Hamilton, Ont.***—E. Fisher. ***Moncton, N. B.***—P. S. Archibald, W. B. Mackenzie. ***Montreal, Que.***—M. J. Butler, F. S. Darling, H. Goldmark, J. Hobson, H. Holgate, H. S. Holt, P. Johnson, J. Kennedy, E. H. McHenry, P. A. Peterson, A. W. Robinson, J. Ross, J. M. Shanly, F. P. Shearwood, W. F. Tye. ***New Westminster, B. C.***—G. A. Keefer. ***Niagara Falls, Ont.***—C. H. Mitchell, A. A. Stuart, B. R. Value. ***Ottawa, Ont.***—W. Crawford, S. Fleming, T. C. Keefer, J. L. P. O'Hanly. ***St. Thomas, Ont.***—J. H. Kennedy. ***Sydney, N. S.***—G. H. Duggan. ***Toronto, Ont.***—W. Chipman, C. L. Fitch, C. E. Goad, W. T. Jennings, E. H. Keating, C. H. Rust. ***Victoria, B. C.***—H. P. Bell, F. C. Gamble, A. S. Going, E. Mohun. ***Winnipeg, Man.***—F. R. Johnson, H. N. Ruttan, J. G. Sullivan.

Associate Members.—***Fredericton, N. B.***—E. E. Brydone-Jack. ***Hamilton, Ont.***—R. M. Roy. ***Lachine Locks, Que.***—E. A. Rhys-Roberts. ***Montreal, Que.***—C. E. Gudewill, R. E. Hunter. ***New Westminster, B. C.***—C. P. Moss, H. K. Seltzer. ***Niagara Falls, Ont.***—J. Thornley. ***Ottawa, Ont.***—S. J. Chapleau. ***Peterborough, Ont.***—W. J. Francis. ***Saint John, N. B.***—J. K. Scammell. ***Sault Ste. Marie, Ont.***—L. H. Davis. ***Toronto, Ont.***—E. R. Simpson. ***Vancouver, B. C.***—C. W. McMeekin. ***Winnipeg, Man.***—A. G. Allan, G. A. Kyle.

Associates.—***Montreal, Que.***—T. J. Drummond, E. McG. Quirk.

Juniors.—***Amherstburg, Ont.***—B. Rohnert. ***London, Ont.***—C. B. Brown, Jr. ***Montreal, Que.***—W. C. Brown. ***Niagara Falls, Ont.***—K. M. Cameron. ***Winnipeg, Man.***—M. P. Cotton.

MEXICO. Total Membership, 41.

Members.—***Bonanza.***—R. C. Gemmell. ***Chihuahua.***—H. W. Edwards, E. S. Safford. ***Colima.***—A. P. Herbert. ***Culiacan.***—F. E. Butterfield. ***Escalon.***—V. P. Safford. ***Hermosillo.***—A. F. Wrotnowski. ***Maconi.***—E. A. H. Tays. ***Mexico.***—R. Adam, J. B. Body, R. E. Briggs, J. E. Earley, R. Gayol, L. Kingman, J. E. McCurdy, J. L. Phillips. ***Monterey.***—R. Meyer, N. Turner. ***Orizaba.***—S. W. Stacpoole. ***Puebla.***—T. A. Corry. ***Saltillo.***—S. B. Burton. ***Tampico.***—A. F. Woolley.

Associate Members.—***Cananea.***—J. P. Hallihan. ***Durango.***—F. W. Andros, R. Johnson. ***Mapimi.***—C. F. Parker. ***Mexico.***—S. J. Fortin, W. G. Moler. ***Monterey.***—F. H. Dillon, F. T. Llewellyn. ***Saltillo.***—W. A. Hill. ***Santa Fe.***—I. Mathewson. ***Tonala.***—J. H. Bowman. ***Vera Cruz.***—J. W. Miles.

Associates.—***Mexico.***—W. W. Graham.

Juniors.—***Chihuahua.***—S. A. Miller, R. S. Webster. ***Cordoba.***—E. E. Howard. ***Guadalajara.***—M. de la Mora. ***Mexico.***—E. Ortiz, F. A. Sherwood.

UNITED STATES.

ALABAMA. Total Membership, 26.

Members.—***Birmingham.***—T. H. Aldrich, J. R. Carter, G. H. Clark, J. A. Emery, H. F. Juengst, J. W. Kendrick, S. H. Lea, J. A. Montgomery. ***Mobile.***—W. W. Hayden, J. N. Hazlehurst. ***Montgomery.***—D. M. Andrews. ***Tuscaloosa.***—R. C. McCalla.

Associate Members.—***Birmingham.***—H. S. Jaudon, H. F. Wilson, Jr., M. H. Wright. ***Demopolis.***—O. E. Strehlow. ***Ensley.***—G. R. Ramsey. ***Holt.***—C. M. Ayres. ***Kingman.***—W. S. Winn. ***Mobile.***—D. G. Anderson. ***Tuscaloosa.***—L. W. Hall, G. K. Little, S. Van Pelt.

Juniors.—***Birmingham.***—F. R. Berry. ***Mobile.***—F. F. Pillet. ***Montgomery.***—W. G. Arn.

ARIZONA. Total Membership, 5.

Members.—***Prescott.***—W. A. Drake. ***Yuma.***—E. T. Perkins.

Associate Members.—***Tucson.***—H. V. B. Osbourn. ***Walker.***—V. N. McGee.

Juniors.—***Tucson.***—G. E. P. Smith.

ARKANSAS. Total Membership, 9.

Members.—***Arkansas City.***—W. D. Jenkins. ***Fort Smith.***—F. A. Molitor. ***Little Rock.***—G. D. Fitch. ***Mansfield.***—G. E. Otis.

Associate Members.—***Fayetteville.***—J. J. Knoch. ***Fort Smith.***—D. A. MacCrea. ***Osceola.***—J. Y. Bayliss.

Juniors.—***Little Rock.***—C. N. Kast. ***Self.***—G. W. Corrigan.

CALIFORNIA. Total Membership, 96.

Honorary Members.—***San Francisco.***—G. Davidson, G. E. Gray.

Members.—***Berkeley.***—W. C. Ambrose, P. E. Harroun. ***Fresno.***—I. Teilman. ***Grass Valley.***—A. DeW. Foote. ***Kernville.***—B. Bassell. ***Los Angeles.***—R. B. Burns, D. W. Cunningham, F. Eaton, F. D. Howell, Jr., J. B. Lippincott, C. H. McKinstry, F. H. Olmsted, J. H. Quinton, J. D. Schuyler, F. E. Trask, E. T. Wright. ***Mill Valley.***—M. M. O'Shaughnessy. ***National City.***—H. N. Savage. ***Oakland.***—E. M. Boggs, L. J. Le Conte. ***Pasadena.***—H. Breen, G. B. Hazlehurst. ***Pomona.***—A. W. Wright. ***Redlands.***—W. A. Nichols. ***San Diego.***—H. T. Richards. ***San Francisco.***—A. L. Adams, F. J. Amweg, B. Bienenfeld, A. J. Bowie, J. H.

Covode, G. L. Dillman, E. Duryea, Jr., W. R. Eckart, W. C. Edes, H. D. Gates, H. E. Green, C. E. Grunsky, W. H. Hall, W. W. Harts, D. C. Henny, W. H. Heuer, S. G. Hindes, H. C. Holmes, W. Hood, J. M. Howells, J. D. Isaacs, N. B. Kellogg, C. List, M. Manson, D. E. Melliss, F. J. H. Rickon, F. Riffle, E. A. Rix, E. K. Smoot, C. H. Snyder, W. B. Storey, Jr., C. Uhlig, O. von Geldern, J. H. Wallace. ***Santa Clara.***—C. E. Moore. ***Stanford University.***—C. D. Marx. ***Ventura.***—G. C. Power.

Associate Members.—***Berkeley.***—C. Derleth, Jr., L. E. Hunt. E. N. Prouty. ***Iron Mountain.***—W. C. Hammatt. ***Los Angeles.***—A. C. Hardison, J. C. McClure, W. S. Post, S. Storrow, J. G. Tait. ***Mare Island.***—A. L. Parsons, H. H. Rousseau. ***Oakland.***—G. D. Stratton. ***Palo Alto.***—J. C. L. Fish, C. B. Wing. ***Pasadena.***—F. E. Wilcox. ***San Francisco.***—S. Baker, H. De H. Connick, R. M. Drake, E. F. Haas, J. Jacobs, N. B. Livermore, J. H. G. Wolf. ***San Pedro.***—A. B. Diehr. ***Truckee.***—H. T. Cory.

Juniors.—***Berkeley.***—F. F. Hall. ***Coyote.***—H. L. Haehl. ***Los Angeles.***—E. L. Veuve. ***Mt. Hamilton.***—J. W. Du B. Gould. ***National City.***—S. N. Cáceres. ***Oakland.***—A. Kempkey, Jr. ***San Francisco.***—C. E. Gilman. ***San Jose.***—K. F. Cooper.

COLORADO. Total Membership, 28.

Members.—***Cheesman.***—F. C. Horn. ***Denver.***—M. Boehmer, F. C. Hitchcock, T. W. Jaycox, A. E. Kastl, J. MacFarlane, G. T. Prince, M. H. Rogers, H. A. Sumner, W. C. Wetherill. ***Edgewater.***—F. A. Calkins. ***Lake City.***—W. H. Leffingwell. ***Pueblo.***—H. R. Holbrook. ***Salida.***—J. W. Deen. ***Telluride.***—C. W. Gibbs, J. Herron.

Associate Members.—***Delta.***—H. Rittenhouse. ***Denver.***—A. C. Bell, C. W. Comstock, G. N. Houston, T. E. Knowlton, O. O. McReynolds, R. S. Sumner. ***La Junta.***—H. C. Phillips. ***Montrose.***—J. A. Sargent. ***Pueblo.***—J. W. Martin.

Juniors.—***Denver.***—W. S. Getchell, V. A. Kauffman.

CONNECTICUT. Total Membership, 50.

Members.—***Berlin.***—D. E. Bradley, C. F. Chase. ***Danbury.***—J. W. Bacon. ***Derby.***—D. S. Brinsmade. ***Hartford.***—H. W. Ayres, G. M. Bond, E. D. Graves, T. H. McKenzie, E. C. Terry. ***Middletown.***—G. H. Bishop. ***New Britain.***—C. M. Jarvis. ***New Haven.***—C. Blakeslee, A. J. Du Bois, C. A. Ferry, H. H. Gladding, A. B. Hill, C. M. Ingersoll, Jr., C. W. Kelly, W. F. Merrill, W. H. Moore. ***New London.***—C. C. Elwell, C. F. Powell. ***Norwalk.***—R. Van Buren. ***Stamford.***—B. D. Greene. ***Waterbury.***—W. W. Bonnett, R. A. Cairns.

Associate Members.—***Bridgeport.***—A. P. Law, S. P. Senior. ***East Berlin.***—S. P. Waldron. ***Hartford.***—E. W. Bush, F. L. Ford, J. T. Henderson. ***New Haven.***—R. D. Coombs, Jr., C. H. Nichols, W. T. Spencer, E. W. Wiggin. ***New London.***—W. Kelly, C. P. Williams. ***South Manchester.***—J. Le R. Adams. ***Stamford.***—L. B. Jenckes. ***West Hartford.***—W. E. Johnson.

Associates.—***Middletown.***—E. T. Belden.

Juniors.—***Hartford.***—H. R. Buck. ***Meriden.***—H. J. Wild. ***New Haven.***—E. E. Minor, E. M. T. Ryder. ***Old Lyme.***—H. T. Griswold. ***Pomfret.***—R. H. Sabin. ***West Haven.***—H. de B. Forbes.

Fellows.—***Waterbury.***—N. J. Welton.

DELAWARE. Total Membership, 8.

Members.—***Newark.***—J. R. Maxwell. ***Wilmington.***—T. C. Hatton, T. A. Leisen, C. A. Miner, G. Tatnall.

Associate Members.—***Wilmington.***—G. Rommel, Jr.

Associates.—***Wilmington.***—A. J. Moxham.

Juniors.—***Wilmington.***—A. J. Taylor.

DISTRICT OF COLUMBIA. Total Membership, 79.

Members.—***Washington.***—F. V. Abbot, P. C. Asserson, F. L. Averill, E. C. Barnard, K. Berle, J. Biddle, W. M. Black, E. Burr, D. S. Carll, F. T. Chambers, A. P. Davis, E. M. Douglas, C. G. Elliott, M. T. Endicott, C. H. Fitch, O. B. French, F. Freyhold, B. R. Green, W. C. Gunnell, P. C. Hains, H. F. Hodges, D. J. Howell, C. B. Hunt, W. V. Judson, C. W. Kutz, D. W. Lum, A. Mackenzie, D. E. McComb, H. L. Marindin, E. Mead, A. M. Miller, F. H. Newell, G. L. Nicolson, A. G. Norton, R. E. Peary, A. E. Phillips, F. C. Prindle, R. Shirreffs, T. W. Symons, O. H. Tittmann, A. H. Weber, J. T. Whistler, E. G. Williams, H. M. Wilson.

Associate Members.—***Washington.***—C. C. Babb, H. Davis, J. H. Hanna, A. C. Harper, J. F. Hayford, E. A. Hill, H. B. Looker, W. C. Lyon, C. A. McKenney, F. E. Matthes, J. J. Morrow, H. Munroe, E. C. Murphy, C. R. Olberg, H. A. Pressey, C. M. Pritchett, E. Schmitt, G. E. Stratton, W. McG. Wallace, F. C. Warman, C. A. Wentworth, F. E. Weymouth.

Associates.—***Washington.***—E. C. Eckel, F. L. Freeman, G. Pinchot.

Juniors.—***Washington.***—R. E. Adams, G. G. Fischer, J. B. Gordon, E. C. Heald, A. H. Horton, M. L. Ireland, W. C. Sawyer, G. L. Warner, F. R. Weller.

Fellows.—***Washington.***—A. L. Barber.

FLORIDA. Total Membership, 10.

Members.—***Fernandina.***—J. H. Bacon. ***Jacksonville.***—J. W. Sackett. ***Mandarin.***—A. F. Harley. ***Mayport.***—F W. Bruce. ***Pensacola.***—H. R. Stanford. ***St. Augustine.***—L. R. McLain.

Associate Members.—***Key West.***—J. M. Braxton. ***Jacksonville.***—F. C. Phillips, E. B. Thomson.

Juniors.—***Pensacola.***—R. D. M. Henley.

GEORGIA. Total Membership, 22.

Members.—***Americus.***—G. M. Eldridge. ***Atlanta.***—R. M. Clayton, B. M. Hall. ***Augusta.***—N. Wingfield. ***Austell.***—D. B. Dunn. ***Blue Ridge.***—G. K. McCormick. ***Columbus.***—B. H. Hardaway. ***Hawkinsville.***—A. Pew. ***Savannah.***—G. M. Gadsden, J. De B. Kops, H. M. Steele.

Associate Members.—*Americus.*—C. W. Murray. ***Athens.***—C. M. Strahan. ***Atlanta.***—T. P. Branch. ***Dodge.***—G. W. Armitage. ***Dunwoody.***—G. Baum. ***Fort McPherson.***—L. H. Mattair.

Associates.—*Atlanta.*—G. H. Crafts.

Juniors.—*Atlanta.*—G. J. Davis, Jr., C. L. Richardson, E. L. Walker. ***Savannah.***—W. D. Faucette.

HAWAII. Total Membership, 4.

Members.—*Honolulu.*—C. H. Kluegel, J. T. Taylor.

Associates.—*Honolulu.*—R. J. Pratt.

Juniors.—*Huelo.*—J. H. Foss.

IDAHO. Total Membership, 4.

Members.—*Boise.*—D. W. Ross, A. J. Wiley. ***Lewiston.***—W. H. Hill.

Associate Members.—*Centerville.*—T. G. Janney.

ILLINOIS. Total Membership, 149.

Members.—*Champaign.*—I. O. Baker. ***Chicago.***—J. W. Alvord, S. G. Artingstall, H. F. Baldwin, W. D. Barber, J. N. Barr, O. Bates, E. H. Beckler, C. E. Billin, G. H. Binkley, W. L. Breckinridge, G. H. Bremner, J. Brunner, H. M. Byllesby, W. M. Camp, E. C. Carter, O. Chanute, G. B. Christie, J. A. Cole, T. L. Condron, L. E. Cooley, W. L. Cowles, A. S. Crane, H. S. Crocker, W. W. Curtis, W. L. Darling, C. R. Dart, W. E. Dauchy, F. A. Delano, J. Dun, A. R. Eldridge, G. E. Ellis, H. N. Elmer, J. E. Ericson, O. H. Ernst, J. M. Ewen, S. M. Felton, R. Forsyth, J. A. Fulton, W. J. Harahan, C. A. Hasbrouck, H. E. Horton, C. W. Hotchkiss, W. M. Hughes, R. W. Hunt, H. H. Jackman, J. W. Kendrick, G. A. Lederle, E. H. Lee, F. J. Llewellyn, J. Lowe, C. F. Loweth, H. C. Lowrie, W. A. Lydon, D. MacAllister, C. MacRitchie, A. J. Mason, D. W. Mead, F. O. Melcher, R. Modjeski, J. Nichol, L. A. Nichols, H. W. Parkhurst, A. V. Powell, I. Randolph, A. F. Reichmann, W. A. Rogers, W. H. Rosencrans, S. McM. Rowe, A. T. Sabin, J. W. Schaub, E. K. Scott, J. A. Seddon, E. C. Shankland, R. M. Shankland, D. Sloan, W. S. Smith, V. K. Spicer, J. F. Stevens, A. C. Stites, C. L. Strobel, F. H. Todd, G. W. Vaughn, J. F. Wallace, C. V. Weston, H. F. White, D. J. Whittemore, P. Willis, G. M. Wisner, A. Ziesing. ***Hoopeston.***—M. S. Parker. ***Joliet.***—F. C. H. Arentz. ***La Grange.***—W. B. Ewing. ***Litchfield.***—A. G. Kleinbeck. ***Peoria.***—D. H. Maury, J. W. Woermann. ***Pullman.***—A. Twyman. ***Quincy.***—E. Prince. ***Rock Island.***—J. L. Lusk, A. L. Richards. ***Sterling.***—L. L. Wheeler. ***Thebes.***—W. E. Angier. ***Urbana.***—A. N. Talbot. ***Winnetka.*** W. H. Finley, L. M. Johnson.

Associate Members.—*Anchor.*—C. B. Stewart. ***Chicago.***—W. H. Ferguson, R. L. Gifford, A. Gravelle, A. H. Green, E. McK. Hagar, J. C. Hain, F. L. Hartigan, C. L. Keller, R. McCulloch, C. W. J. Neville, E. L. Shaw, E. M. Smith, J. G. Spielman, W. E. S. Strong, E. E. R. Tratman, E. Walther. ***East St. Louis.***—C. J. Eld, Jr., E. G. Helm. ***Fulton.***—J. C. Sesser

Galesburg.—J. E. Murphy. ***Geneseo.***—M. G. Barnes. ***Peoria.***—J. A. Harman. ***Shabbona Grove.***—J. E. Shepardson. ***Shelbyville.***—C. E. Chester. ***Sterling.***—F. W. Honens.

Associates.—***Chicago.*** - C. M. Foster, J. P. Johnston, W. J. Karner, C. F. Quincy, J. H. Warder.

Juniors.—***Chicago.***—R. J. Bassett, B. Borland, M. S. Darrow, W. F. Graves, A. R. Holliday, W. Raster, M. E. Shire, R. A. Widdicombe. ***Ogden.***—E. D. Harshbarger. ***Peoria.***—C. Millard.

Fellows.—***Chicago.***—E. W. Blatchford, N. S. Bouton, G. C. Walker.

INDIAN TERRITORY. Total Membership, 3.

Members.—***Sulphur.***—H. V. Hinckley.

Associate Members.—***Panama.***—H. A. Paine.

Juniors.—***Muskogee.***—S. A. Cobb.

INDIANA. Total Membership, 20.

Members.—***Frankfort.***—J. L. Frazier. ***Guilford.***—H. F. Northrup. ***Indianapolis.***—C. C. Brown, M. M. Defrees, J. A. McKim, M. W. Mansfield, T. Pettigrew, R. P. Woods. ***Lafayette.***—W. D. Pence. ***Terre Haute.***—F. T. Hatch, M. A. Howe. ***Washington.***—L. C. Fritch.

Associate Members.—***Anderson.***—W. S. Moore. ***Bluffton.***—O. S. Osborn. ***Evansville.***—G. F. Stickney. ***Indianapolis.***—C. S. Millard, C. A. Paquette. ***Lafayette.***—W. K. Hatt. ***Marion.***—H. F. Coleman.

Juniors.—***Indianapolis.***—S. Horton.

IOWA. Total Membership, 16.

Members.—***Ames.***—A. Marston. ***Burlington.***—F. D. H. Lawlor. ***Davenport.***—G. H. Boynton, C. Francis. ***Des Moines.***—D. H. Ainsworth. ***Fort Madison.***—F. M. Bisbee. ***Iowa City.***—A. V. Sims. ***Iowa Falls.***—R. C. Young. ***Keokuk.***—M. Meigs. ***Sioux City.***—H. M. Chittenden.

Associate Members.—***Ames.***—L. E. Ashbaugh, F. C. French. ***Burlington.***—E. A. Steece. ***Clinton.***—W. P. Boright. ***Davenport.***—W. H. Kimball.

Associates.—***Mason City.***—J. B. Stouder.

KANSAS. Total Membership, 11.

Members.—***Lawrence.***—W. McGrath, F. O. Marvin. ***Leavenworth.***—E. H. Connor, A. B. Ross, A. J. Tullock, M. A. Waldo. ***Topeka.***—E. W. Grant, C. A. Morse, A. F. Robinson.

Associate Members.—***Leavenworth.***—R. W. Carter, C. M. Pritchard.

KENTUCKY. Total Membership, 32.

Members.—***Covington.***—G. B. Nicholson. ***Danville.***—C. Breckinridge. ***Earlington.***—J. B. Atkinson. ***Kuttawa.*** — L. Anderson. ***Louisa.***—L. S. Johnson, B. F. Thomas. ***Louisville.***—W. H. Courtenay, F. de Funiak, J. A. Fairleigh, C. Hermany, W. E. Hutchings, J. M. Johnson, E. E. Kuersteiner, R. Montfort, M. Morris, G. W. Shaw, J. E. Willard. ***St. Matthews.***—R. Fink.

Associate Members.—***Lebanon.***—J. F. Burns. ***Lexington.***—J. P. Brooks, W. A. D. Short. ***Louisville.***—N. H. Janvrin, J. G. MacGregor, E. Zarbell. ***Newport.***—W. L. Glazier. ***Somerset.***—C. C. FitzGerald.

Associates.—***Louisville.***—J. B. Speed.

Juniors.—***Somerset.***—W. H. Starr.

Fellows.—***Louisville.***—J. W. Ainslie, W. R. Belknap, T. C. Coleman, B. du Pont.

LOUISIANA. Total Membership, 24.

Members.—***Lake Charles.***—L. W. Stubbs. ***New Orleans.***—A. C. Bell, L. F. Bellinger, L. W. Brown, J. F. Coleman, C. Donovan, G. G. Earl, W. J. Hardee, B. M. Harrod, F. M. Kerr, S. F. Lewis, J. T. Norton, A. Perrilliat, H. B. Richardson, W. L. Wilson, W. B. Wright.

Associate Members.—***New Orleans.***—J. R. Downman, J. T. Eastwood, L. E. Lion, M. P. Robertson, W. M. Venable. ***Shreveport.***—A. Mayer.

Juniors.—***Lake Charles.***—D. M. Duller. ***New Orleans.***—J. F. Richardson.

MAINE. Total Membership, 20.

Members.—***Bangor.***—W. Crosby. ***Boothbay Harbor.***—T. W. Baldwin. ***Gardiner.***—F. Danforth. ***Houlton.***—M. Burpee. ***Millinocket.***—H. S. Ferguson. ***Orono.***—G. H. Hamlin. ***Portland.***—C. C. A. Both, F. S. Burrowes, B. W. Guppy, E. C. Jordan. ***Rumford Falls.***—C. A. Mixer. ***Wiscasset.***—G. P. Farley.

Associate Members.—***Bangor.***—F. L. Marston. ***Millinocket.***—J. W. Tower. ***Orono.***—H. S. Boardman. ***Portland.***—C. R. Hall. ***Rockland.***—O. H. Tripp.

Juniors.—***Augusta.***—L. Pearse. ***Cape Cottage.***—A. L. True. ***Millinocket.***—H. P. Hoyt.

MARYLAND. Total Membership, 40.

Members.—***Annapolis.***—A. C. Cunningham. ***Baltimore.***—H. D. Bush, M. L. Byers, D. D. Carothers, M. Cohen, B. T. Fendall, E. A. Frink, J. M. Graham, J. E. Greiner, F. H. Hambleton, J. H. Harlow, C. A. Hook, R. L. Hoxie, N. H. Hutton, W. L. Kenly, L. F. Loree, W. T. Manning, C. S. Sims, C. O. Vandevanter. ***Cumberland.***—J. Q. Barlow, F. L. Stuart. ***Frostburg.***—B. S. Randolph. ***Ruxton.***—J. Fisher.

Associate Members.—***Annapolis.***—J. V. Rockwell, A. J. Wills. ***Baltimore.***—E. D. Cummings, W. R. Edwards, H. S. Farquhar, I. O. Harper, W. N. Hazen, V. K. Hendricks, A. N. Johnson, A. M. Quick. ***Conowingo.***—J. H. Harlow, Jr., G. F. Rowell. ***Cumberland.***—A. W. Thompson. ***Fort Washington.***—H. A. Young. ***Sparrows Point.***—L. M. Cox.

Juniors.—***Annapolis.***—C. H. Stratton. ***Chestertown.***—M. deK. Smith, Jr.

MASSACHUSETTS. Total Membership, 171.

Honorary Members.—***Boston.***—C. S. Storrow.

Members.—***Auburndale.***—W. P. Snow. ***Boston.***—C. F. Allen, T. Aspinwall, F. A. Barbour, T. H. Barnes, E. J. Beugler, D. Brackett, W. H. Bradley, F. Brooks, W. M. Brown, A. E. Burton, H. A. Carson, H. H. Carter, A.

S. Cheever, J. E. Cheney, S. Child, E. C. Clarke, F. C. Coffin, W. W. Cummings, F. S. Curtis, R. B. Davis, E. P. Dawley, E. S. Dorr, G. E. Evans, F. H. Fay, B. R. Felton, J. P. Frizell, F. L. Fuller, X. H. Goodnough, J. N. Greene, H. A. Hall, E. Harrington, H. W. Hayes, F. W. Hodgdon, G. Hodges, J. L. Howard, E. W. Howe, W. Jackson, W. H. Jaques, G. A. Kimball, W. E. McClintock, H. Manley, L. Metcalf, E. F. Miller, H. A. Miller, G. S. Morrill, C. Morton, J. C. Ostrup, W. Parker, W. T. Pierce, A. L. Plimpton, D. Porter, L. F. Rice, I. Rich, J. W. Rollins, Jr., W. Rotch, C. M. Saville, E. Sawyer, C. W. Sherman, G. E. Sleeper, J. P. Snow, O. Sonne, F. P. Stearns, G. F. Swain, L. A. Taylor, S. E. Tinkham, G. M. Tompson, E. K. Turner, L. C. Wason, W. Watson, W. Wheeler, F. O. Whitney, H. B. Wood, C. J. H. Woodbury, J. R. Worcester. ***Brookline.***—S. C. Ellis, D. FitzGerald, A. H. French. ***Cambridge.***—E. D. Leavitt. ***Clinton.***—H. Parker, T. F. Richardson, C. E. Wells. ***East Boston.***—R. A. Shailer. ***Holyoke.***—T. Appleton, E. P. Butts, N. H. Whitten. ***Hyde Park.***—E. A. W. Hammatt. ***Jamaica Plain.***—S. C. Heald. ***Lawrence.***—R. A. Hale, I. L. Sjöström. ***Lowell.***—G. Bowers, A. T. Safford. ***Lynn.***—C. W. Gay. ***Malden.***—J. H. Clark, G. A. Wetherbee. ***New Bedford.***—A. B. Drake. ***Newton Center.***—D. H. Andrews. ***North Adams.***—J. H. Emigh, F. B. Locke. ***Somerville.***—W. F. Goodrich. ***South Framingham.***—H. Ropes. ***Springfield.***—G. N. Merrill, M. Moulton, C. M. Slocum. ***Taunton.***—L. Dean. ***Tufts College.***—F. B. Sanborn. ***Turners Falls.***—C. W. Hazelton. ***West Medford.***—H. Bissell. ***West Newton.***—H. D. Woods. ***West Somerville.***—L. W. Tucker. ***Worcester.***—C. A. Allen, R. H. Brown, W. E. Buck, D. M. Wheeler, G. H. White.

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MISSOURI. Total Membership, 90.

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Juniors.—***Albuquerque.***—E. M. Chadbourne.

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H. E. Baker. ***West New Brighton.***—C. E. Trout. ***West Point.***—W. D. Connor, J. A. Woodruff.

Associates.—***Brooklyn.***—A. L. Colsten, W. Gibson, Jr., A. R. Piper, F. Wilcock, H. S. Wilgus. ***Buffalo.***—L. J. Bennett, C. W. Bradley, P. H. Griffin, J. MacGregor, A. W. Thorn. ***Croton-on-Hudson.***—J. B. Goldsborough. ***Elmira.***—J. M. Diven. ***Ithaca.***—I. P. Church, H. S. Jacoby. ***Long Island City.***—C. Richardson. ***New York City.***—E. L. Abbott, E. R. Ackerman, J. W. Auchincloss, R. C. C. M. Bernegau, S. S. Bogart, M. D. Chapman, S. K. Colby, A. G. Compton, C. G. Currier, E. J. Farrell, W. C. Fisk, G. H. Frost, A. C. Gildersleeve, J. F. Golding, J. M. Goodell, C. M. Harris, C. F. A. Hennessey, O. B. Keller, W. King, Jr., A. Liebmann, C. F. McKenna, H. C. Meyer, Jr., J. Monks, Jr., W. C. Oastler, R. G. Packard, Jr., R. Peverley, W. A. Polk, L. R. Pomeroy, E. L. Ransome, F. H. Smith, F. Snare, F. L. Stearns, M. Toch, C. Tomkins, W. G. F. Triest, S. M. Turrill, M. Watson, G. A. Weber, J. A. Wells, C. G. Young. ***Niagara Falls.***—A. C. Douglass, A. H. G. Hardwicke. ***Poughkeepsie.***—W. F. Booth. ***Tomkins Cove.***—R. I. Odell. ***Troy.***—L. B. Harrison. ***Watertown.***—C. E. Dewey. ***Yonkers.***—H. J. Kaltenbach.

Juniors.—***Albany.***—R. E. Dougherty, F. B. Harrington, L. L. Melius, J. R. Taft. ***Brooklyn.***—W. W. Brush, J. P. Carlin, J. Clausnitzer, P. J. Cleaver, De F. H. Dixon, W. L. Dusenberry, E. W. Firth, J. C. Gray, R. H. Hammer, L. T. Haney, G. G. Hopkins, Jr., R. W. How, O. M. Kelly, K. Lindsey, A. W. Parker, J. Schmitt, H. S. Williams, H. W. Woodcock, C. R. Wyckoff, Jr. ***Buffalo.***—J. G. Ullmann. ***Croton-on-Hudson.***—A. U. Whitson. ***Geneva.***—R. L. Burwell. ***Hornellsville.***—G. C. Woollard. ***Ithaca.***—E. W. Schoder. ***Jamaica.***—R. W. Gay. ***Massena.***—E. B. Bumsted. ***Middletown.***—C. H. Smith. ***New Rochelle.***—J. L. Tatlock. ***New York City.***—J. S. Adey, W. B. Bamford, D. E. Baxter, B. F. Bell, T. Belzner, L. S. Benton, H. E. Boardman, B. Braslow, E. B. Brisley, H. R. Codwise, H. Conrow, J. N. H. Cornell, W. E. Crane, G. W. Culgin, A. M. Day, A. H. Diamant, J. R. Dimond, J. W. Doty, J. Dougan, J. A. Ely, Jr., G. W. Enos, M. S. Falk, J. R. Furman, E. P. Goodrich, J. W. Goodridge, C. W. Hall, M. W. Hall, R. Hamlin, H. G. Harrington, S. J. Harwi, J. Y. Higginson, J. J. Hopper, R. H. Howes, C. H. Jabelonsky, H. J. Kolb, F. P. Lant, G. W. Lee, G. G. MacCracken, A. A. Macdonald, H. B. Machen, R. A. McCulloch, L. McHarg, J. H. Madden, J. D. Matheson, N. A. Melick, C. W. Meyers, L. G. Morphy, C. H. Nutter, A. S. Nye, G. I. Oakley, G. H. Paine, A. C. Polk, R. F. Proctor, R. Quanz, D. H. Ray, W. B. Reed, Jr., A. E. Riedel, M. H. Ryan, E. L. Sayers, C. J. Schumann, G. T. Seabury, J. H. Small, Jr., M. H. Smith, C. U. Stepath, J. W. Sussex, J. S. Swindells, C. Tombo, J. M. Towne, J. O. Van Brakle, H. L. Van Zile, C. L. Wachter, C. R. Ward, B. F. Welton, A. E. Wenige, E. B. Whitman, T. B. Whitney, Jr., J. H. Wickersham, C. L. Wilcox, R. B. Williams, Jr., A. J. Zabriskie. ***Rochester.***—W. J. Stewart. ***Scarsdale.***—C. Hyatt. ***Syracuse.***—C. H. Snyder, W. G. Wildes. ***Taughannock Falls.***—S. C. Hulse. ***Troy.***—H. M. George, N. A. Taylor. ***Utica.***—A. Adams. ***Watertown.***—P. H. Winchester.

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OKLAHOMA. Total Membership, 4.

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Juniors.—***Yale.***—W. J. Plogsted.

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Members.—***Allegheny.***—P. Didier. ***Allentown.***—C. A. Matcham. ***Altoona.***—C. B. Dudley, H. Linton, L. R. Zollinger. ***Ambridge.***—R. Khuen, C. G. E. Larsson, J. K. Lyons, P. L. Wolfel. ***Athens.***—C. Kellogg, C. S. Maurice. ***Beaver.***—A. B. McGrew, G. Thompson. ***Beaver Falls.***—C. M. Emmons, T. S. White. ***Bellevue.***—W. Martin. ***Crafton.***—J. S. Haring. ***Cresson.***—C. S. d'Invilliers. ***Easton.***—H. R. Fehr, F. Firmstone, A. P. Folwell, J. McNeal, Jr. ***Erie.***—J. Supplee. ***Greensburg.***—J. B. Bott. ***Greenville.***—H. T. Porter. ***Harrisburg.***—J. V. W. Reynders. ***Huntingdon.***—J. M. Africa. ***Jeddo.***—P. H. De Witt. ***Johnstown.***—G. E. Thackray. ***Mauch Chunk.***—J. Ruddle. ***Meadville.***—W. A. Doane. ***Pencoyd.***—J. Christie, H. F. Lofland, H. S. Prichard. ***Philadelphia.***—G. Aertsen, C. C. F. Bent, W. F. Biddle, G. P. Bland, A. Bonzano, P. F. Brendlinger, R. C. Clarkson, F. H. Clement, G. E. Datesman, M. W. Easby, T. N. Ely, W. C. Furber, H. T. Grantham, S Harris, L. M. Haupt, J. W. Hill, W. Hunter, A. S. Ives, W. Jones, H. F. Labelle, J. W. Ledoux, H. R. Leonard, J. H. Linville, D. J. Lucas, T. C. McCollom, E. Marburg, C. M. Mills, S. P. Mitchell, H. G. Morris, W. J. Nicolls, A. B. Paine, J. C. Patterson, C. P. Perkins, W. A. Pratt, S. M. Prevost, H. H. Quimby, S. Rea, D. Reeves, J. T. Richards, P. Roberts, Jr., P. M. Sax, L. Y. Schermerhorn, H. A. Schofield, C. Sellers, E. F. Smith, H. C. Smith, J. S. Smith, H. Souder, C. A. Sundstrom, J. C. Temple, R. Thayer, E. D. Thompson, I. W. von Leer, T. Voorhees, S. T. Wagner, J. Wainwright, G. S. Webster, W. R. Webster, D. H. Whitmer, H. W. Wilson. ***Phœnixville.***—H. C. Baird, J. S. Deans, C. W. Hudson. ***Pittsburg.***—W. A. Aiken, J. A. Atwood, O. Benson, E. M. Bigelow, J. C. Bland, W. Bradford, A. F. Brown, W. R. Browne, J. N. Chester, R. A. Cummings, W. C. Cushing, C. Davis, G. S. Davison, W. F. Dennis, E. Gerber, G. R. Harlow, T. H. Johnson, M. Knowles, H. Laub, W. Metcalf, C. H. Miller, E. K. Morse, J. C. Neale, J. N. Ostrom, O. R. Pihl, W. G. Price, T. Rodd, F. G. Ross, H. B. Rust, W. L. Scaife, A. L. Schultz, W. L. Sibert, G. H. Simpson, E. Swensson, E. B. Taylor, S. A. Taylor, S. La R. Tone, J. W. Walker, E. F. Wendt, G. Westinghouse, Jr., F. Wilcox, W. G. Wilkins, J. Wood, C. Worthington. ***Reading.***—A. Bryson, F. S. Stevens. ***Ridley Park.***—C. G. Darrach. ***St. Marys.***—S. Wimmer. ***Scranton.***—J. Archbald, W. McK. Marple, W. A. May, C. C. Rose, J. G. Sanderson. ***South Bethlehem.***—M. Merriman, F. E. Schall. ***State College.***—F. E. Foss, E. D. Walker. ***Steelton.***—H. H. Campbell, F. W. Cohen, L. E. Johnson, C. H. Mercer, M. D. Pratt. ***Swarthmore.***—A. Beardsley. ***Towanda.***—S. T. Hayt, Jr. ***Uniontown.***—C. J. Morse. ***Wilkesbarre.***—C. E. Brodhead, R. V. A. Norris. ***Wilkinsburg.***—W. C. Hawley.

Associate Members.—***Allegheny.***—R. Albree, L. J. Riegler. ***Allentown.***—H. F. Bascom. ***Ambridge.***—J. Blodgett, M. Burden, F. A. Hastings, J. B.

Leeper, L. D. Rights, L. H. Shoemaker, J. C. Spencer, W. M. White. ***Bethlehem.***—R. E. Neumeyer. ***Butler.***—E. G. Lane. ***Chambersburg.***—T. J. Brereton. ***East Downingtown.***—R. I. D. Ashbridge. ***East Pittsburg.***—T. D. Lynch. ***Easton.***—J. M. Porter. ***Economy.***—J. C. Barr. ***Erie.***—G. H. Fenkell, C. Olds. ***Frankford.***—S. M. Van Loan. ***Harrisburg.***—C. I. Bausher, F. C. A. G. Bergengren, G. M. Braune, C. G. Hyde. ***Hokendauqua.***—S. R. Thomas. ***Jersey Shore.***—A. W. Carpenter. ***Johnstown.***—C. P. Collins, D. T. Corning, V. S. Doebler, L. R. Gifford, R. M. Greene. ***Lewisburg.***—W. Frick. ***McCall's Ferry.***—B. Ehle. ***New Castle.***—T. A. Gilkey. ***Parkwood.***—F. R. Davis. ***Pencoyd.***—A. Hirst. ***Philadelphia.***—T. J. Carlile, E. Clark, D. L. Despard, W. H. Ford, B. Franklin, R. E. Griswold, J. F. Hasskarl, R. L. Humphrey, J. A. Kelley, E. F. Kenney, B. B. Lathbury, H. W. Latta, W. T. Lyle, W. A. Moncure, F. C. Schmitz, T. N. Spencer, S. M. Swaab, J. A. Vogleson, J. C. Wagner, W. L. Webb, P. H. Wilson. ***Phœnixville.***—S. Gowen. ***Pittsburg.***—L. J. Affelder, J. E. Banks, G. T. Barnsley, P. Brynn, G. H. Burgess, G. H. Clapp, J. L. de Vou, J. R. Elliott, F. Engström, E. S. Fickes, F. E. Field, H. A. Greene, G. Gudmundsson, M. D. Hayes, R. G. Hengst, W. M. Rosewater, C. L. E. Schenk, E. M. Scofield, J. L. Stuart, G. C. Urquhart, W. Whited, W. D. Wiggins, T. J. Wilkerson. ***Rillton.***—W. H. Hyde. ***Saltsburg.***—A. Smith. ***Steelton.***—C. A. Alden, S. W. Bradshaw, E. De Witt. ***Summit Hill.***—A. Schneider. ***Warren.***—De F. A. Wheelock. ***Watsontown.***—C. J. Hogue. ***West Pittsburg.***—J. M. Cunningham.

Associates.—***Allentown.***—C. M. Saeger. ***Chester.***—S. G. Comfort. ***Erie.***—W. C. Olds. ***Overbrook.***—S. Bent. ***Philadelphia.***—W. H. Barnes, G. Burnham, Jr., L. V. Clark, W. R. Copeland, W. G. Hartranft, R. W. Lesley, J. P. A. Maignen, J. C. Trautwine, Jr., J. W. Zipperlein. ***Pittsburg.***—W. L. Abbott, J. A. Huston, L. C. Phipps. ***Steelton.***—G. W. Parsons.

Juniors.—***Allentown.***—F. A. Hausman. ***Bangor.***—W. R. Jordan. ***Beaver.***—W. H. Chadbourn, Jr. ***Bethlehem.***—F. R. Schmid, H. R. St. A. Walters. ***Canonsburg.***—P. A. Blackwell. ***Connellsville.***—S. A. Becker. ***Dravosburg.***—G. R. Sinnickson. ***Galeton.***—J. H. Burgoyne, Jr. ***Greenville.***—F. R. S. Layng, W. H. Waugh. ***Harrisburg.***—R. R. Fernow. ***New Castle.***—J. B. Cameron. ***Oil City.***—J. H. Miner. ***Pencoyd.***—W. E. Belcher. ***Philadelphia.***—W. Fisher, W. S. Hanna, W. S. Harding, H. C. Ives, A. S. Kibbe, H. McBurney, L. Merz, R. Murray, E. M. Rhett, W. P. Taylor, H. W. Underwood, F. M. Weaver. ***Pittsburg.***—C. G. Dunnells, C. S. Lambie, R. J. Mansfield, A. H. Nelson, D. Y. Swaty. ***Royersford.***—E. J. Moore. ***Vilas.***—J. E. Porter. ***Wilkesbarre.***—C. Enzian. ***Wilkinsburg.***—C. L. Fox.

Fellows.—***Philadelphia.***—E. W. Clark.

RHODE ISLAND. Total Membership, ~~31~~ 32

Members.—***Arlington.***—H. N. Francis. ***Central Falls.***—W. F. Keene. ***East Providence.***—J. H. Armington. ***Newport.***—J. P. Cotton, W. H. Lawton,

ERRATA.

LIST OF MEMBERS, 1904.

Add in seventh line, page 171, after P. S. Perkins, the name of E. W. Ross. Change total membership in Rhode Island to 32.

S. B. Williamson. ***Pawtucket.***—G. A. Carpenter. ***Providence.***—W. D. Bullock, C. F. Chase, O. F. Clapp, J. V. Dart, J. R. Freeman, S. M. Gray, W. H. Knight, G. H. Leland, O. P. Sarle, E. W. Shedd, J. H. Shedd, H. E. Sherman, W. H. G. Temple, G. C. Tingley, E. B. Weston. ***Woonsocket.***—J. W. Ellis.

Associate Members.—***Newport.***—G. A. McKay. ***Providence.***—J. S. Browne, J. E. Hill, P. S. Perkins, E W Rose I. S. Wood. ***Westerly.***—T. McKenzie.

Juniors.—***Providence.***—W. L. Anthony, A. H. Blanchard.

SOUTH CAROLINA. Total Membership, 10.

Members.—***Charleston.***—J. P. Allen. ***Georgetown.***—R. Whitford. ***Greenville.***—J. E. Sirrine. ***Moultrieville.***—W. A. Leland. ***Spartanburg.***—W. B. W. Howe.

Associate Members.—***Charleston.***—J. H. Dingle, W. M. Smith.

Associates.—***Spartanburg.***—G. O. Tenney.

Juniors.—***Charleston.***—W. C. Bunnel, L. R. Whitted.

SOUTH DAKOTA. Total Membership, 1.

Members.—***Lead.***—B. Moody.

TENNESSEE. Total Membership, 35.

Members.—***Chattanooga.***—H. S. Bosler, J. C. Guild, B. Thompson, J. M. G. Watt. ***Columbia.***—W. P. Watson. ***Jackson.***—H. P. Farrar. ***Knoxville.***—W. W. Carson, F. C. Kimball. ***Memphis.***—A. L. Dabney, W. Gerig, L. Y. Kerr, E. W. V. C. Lucas, F. B. Maltby, A. L. Phillips. ***Nashville.***—A. J. Dyer, W. F. Foster, E. C. Lewis, C. A. Locke, H. McDonald, W. N. McDonald, T. H. Tutwiler, J. S. Walker, F. S. Washburn. ***Tullahoma.***—C. B. Wilson.

Associate Members.—***Chattanooga.***—E. E. Betts, W. H. Converse, S. D. Rockenbach. ***Crandull.***—F. L. Garrison. ***Dossetts.***—C. E. Bright. ***Knoxville.***—V. D. Hite-Smith. ***Memphis.***—F. W. Lepper, J. A. Omberg, Jr., H. N. Pharr.

Juniors.—***Nashville.***—W. D. Rhea. ***Ridgetop.***—G. T. Paraschos.

TEXAS. Total Membership, 31.

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Juniors.—***Fort Worth.***—C. H. Zane-Cetti, B. G. Leake. ***Galveston.***—C. G. Wells. ***Gaston.***—T. L. Smith, Jr. ***Houston.***—R. D. Parker.

GEOGRAPHICAL DISTRIBUTION

UTAH. Total Membership, 11.

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Juniors.—***Ogden.***—L. B. Spencer. ***Salt Lake City.***—F. G. White, W. E. Wilson.

VERMONT. Total Membership, 6.

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Associate Members.—***Burlington.***—H. K. Barrows. ***St. Albans.***—R. H. P. Ford.

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Associates.—***Blackstone.***—E. B. Fishburne, Jr. ***Norfolk.***—E. L. Du Barry.

Juniors.—***Roanoke.***—J. E. Crawford, J. G. Shryock.

WASHINGTON. Total Membership, 24.

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Associates.—***Seattle.***—A. H. Fuller, O. H. P. La Farge.

Juniors.—***Fort Flagler.***—H. J. M. Baker. ***North Yakima.***—P. W. Price. ***Port Townsend.***—C. C. More. ***Seattle.***—S. B. Hill. ***Tacoma.***—A. McL. Hawks.

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Members.—***Bellington.***—F. A. Coleman. ***Charleston.***—A. M. Scott. ***Clarksburg.***—A. C. Dennis, T. M. Jackson. ***New Cumberland.***—C. E. Grafton.

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Associates.—***Charleston.***—W. D. Sell.

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Associate Members.—***La Crosse.***—M. J. Thompson. ***Madison.***—F. O. Dufour, L. S. Smith, F. E. Turneaure. ***Milwaukee.***—H. N. Cole, R. E. Newton.

Associates.—***Milwaukee.***—J. R. Berthelet. ***North Milwaukee.***—T. R. Brown.

Fellows.—***Milwaukee.***—S. M. Green.

WYOMING. Total Membership, 3.

Members.—***Cheyenne.***—H. B. Patten. ***Four Bear.***—W. D. Pickett. ***Sheridan.***—E. Gillette.

CENTRAL AMERICA.

COSTA RICA. Total Membership, 2.

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Associate Members.—***Limon.***—S. H. Scharschmidt.

NICARAGUA. Total Membership, 2.

Members.—***Greytown.***—P. W. Chamberlain. ***Managua.***—J. C. Wiest.

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SALVADOR. Total Membership, 2.

Members.—***Santa Ana.***—A. J. Scherzer.

Associate Members.—***San Salvador.***—G. S. Walsh.

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Associate Members.—***Buenos Aires.***—J. Abella. ***Mendoza.***—J. J. Corti.

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Members.—***Alagoinhas.***—M. de Teive e Argollo.

CHILI. Total Membership, 2.

Members.—***Valparaiso.***—E. Budge, E. B. Budge.

COLOMBIA. Total Membership, 2.

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Associate Members.—***Palmira.***—H. J. Eder.

PERU. Total Membership, 3.

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WEST INDIA ISLANDS.

CUBA. Total Membership, 12.

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Associate Members.—***Guantanamo.***—A. S. Hobby. ***Havana.***—T. L. Huston, A. E. Mesa, J. R. Villalon. ***Mayari.***—E. W. McCormack.
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JAMAICA. Total Membership, 1.

Members.—***Kingston.***—C. McK. Craig.

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Members.—***San Juan.***—R. Giles.
Associate Members.—***San Juan.***—V. A. Harris.

TRINIDAD. Total Membership, 1.

Members.—***Port of Spain.***—M. W. Cooley.

EUROPE.

AUSTRIA. Total Membership, 2.

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FRANCE. Total Membership, 2.

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GERMANY. Total Membership, 3.

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Members.—***Prenzlau.***—R. Bassel.
Associate Members.—***Berlin.***—T. Shima.

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Members.—***Carlisle, Eng.***—G. J. Bell. ***Edinburgh, Scot.***—J. H. Cunningham. ***Freshford, Eng.***—E. H. Stone. ***Glasgow, Scot.***—D. A. Matheson. ***London, Eng.***—R. Ballard, R. T. Bayliss, J. R. Bell, W. H. Booth, J. R. Chapman, G. E. Church, A. N. Connett, J. F. Flagg, A. G. Glasgow, K. P. Hawksley, J. W. Jacomb-Hood, C. Kadono, J. A. McDonald, O. J. Marstrand, H. S. Maxim, T. Michell, W. B. Myers-Beswick, J. P. O'Donnell, E. B. Thornhill, T. D. Whistler, M. E. Yeatman. ***Middlesbrough, Eng.***—A. M. Mosscrop. ***Newcastle-upon-Tyne, Eng.***—J. M. Moncrieff.
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Associates.—***London, Eng.***—M. Hunsiker. E. A. Rogers.
Juniors.—***London, Eng.***—R. Tappan.

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Members.—***Amsterdam.***—R. P. J. Tutein-Nolthenius.

NORWAY. Total Membership, 1.

Associate Members.—***Christiania.***—G. H. Vedeler.

RUSSIA. Total Membership, 4.

Members.—***Novorossüsk.***—T. S. Shmeleff. ***St. Petersburg.***—S. de Kareischa, V. E. Timonoff.
Associate Members.—***St. Petersburg.***—S. P. Maximoff.

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Members.—***Barcelona.***—J. Tintorer y Giberga.

SWITZERLAND. Total Membership, 1.

Members.—***Zurich.***—K. E. Hilgard.

AFRICA.

Total Membership, 8.

Members.—***East London, Cape Colony.***—C. Anthony, Jr. ***Randfontein, Transvaal.***—P. Yeatman. ***Swakopmund, Ger. S. W. Africa.***—T. Tönnesen.

Associate Members.—***Cape Town, Cape Colony.***—G. A. Lund. ***Durban, Natal.***—W. M. Homan. ***Gwelo, Rhodesia.***—C. Corner. ***Johannesburg, Transvaal.***—E. Hazard, A. W. Stockett.

ASIA.

CHINA. Total Membership, 11.

Members.—***Hong Kong.***—J. Orange. ***Shanghai.***—C. Mayne. ***Tientsin.***—C. D. Jameson, C. W. Kinder, T. W. T. Tuckey.

Associate Members.—***Canton.***—J. Burns. ***Shanghai.***—E. W. Ross, T. A. Ross. ***Tientsin.***—E. G. Adams, Jr., T. J. Bourne.

Juniors.—***Canton.***—W. K. Runyon.

COREA. Total Membership, 1.

Associate Members.—***Seoul.***—B. C. Donham.

INDIA. Total Membership, 7.

Members.—***Calcutta.***—F. Palmer. ***Madras.***—F. J. E. Spring.

Associate Members.—***Calcutta.***—E. Brook-Fox, J. C. Mills, W. E. Pincombe. ***Raneeganj.***—R. H. Sears. ***Trichur.***—G. E. Browning.

JAPAN. Total Membership, 12.

Members.—***Kobe.***—C. Albertson, J. Yamaguchi. ***Moji.***—M. Sengoku. ***Osaka.***—K. Murakami. ***Tokyo.***—S. Kondo, T. Kondo, M. Otagawa, N. Shiraishi.

Associate Members.—***Niigata.***—Y. Wada. ***Tokyo.***—T. Tsuji.

Associates.—***Kyoto.***—K. Futami.

Juniors.—***Tokyo.***—S. Fujino.

PHILIPPINE ISLANDS. Total Membership, 12.

Members.—***Cavite.***—F. O. Maxson. ***Manila.***—J. W. Beardsley, C. E. L. B. Davis, O. L. Ingalls, C. Keller, G. R. Putnam, H. Taylor, C. McD. Townsend.

Associate Members.—***Lucena.***—H. C. Humphrey. ***Manila.***—A. Gideon.

Juniors.—***Manila.***—E. M. Adams, A. F. Armstrong.

STRAITS SETTLEMENTS. Total Membership, 1.

Members.—***Singapore.***—S. Tomlinson.

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Total Membership, 19.

Members.—***Adelaide, Australia.***—A. B. Moncrieff. ***Brisbane, Australia.***—J. B. Henderson, A. W. Jardine. ***Christchurch, New Zealand.***—C. J. R. Williams. ***Mareeba, Australia.***—A. S. Frew. ***Melbourne, Australia.***—W. C. Kernot, H. C. Mais. ***Perth, Australia.***—H. Serjeant, J. S. Walker. ***Randwick, Australia.***—R. Watkins. ***Sydney, Australia.***—P. Allan, J. W. Grimshaw, W. H. Warren.

Associate Members.—***Adelaide, Australia.***—H. F. Nichols. ***Chelmer, Australia.***—R. D. A. Frew. ***Geraldton, Australia.***—H. A. Cresswell. ***Napier, New Zealand.***—W. S. Charlsworth. ***Sydney, Australia.***—H. L. Jones. ***Woollahra, Australia.***—J. I. Haycroft.

ADDRESS UNKNOWN. Total, 10.

Members.—J. C. Irwin, C. W. Raymond, W. B. Ruggles.
Associate Members.—E. T. Morrison, C. A. Slayton, A. C. Wheatley.
Juniors.—R. C. Kimball, W. McKeever.
Fellows.—E. W. Coit, G. Merritt.

TOTAL MEMBERSHIP, 2 954.

SUMMARY OF GEOGRAPHICAL DISTRIBUTION.

NORTH AMERICA.

CANADA	67	
MEXICO	41	
UNITED STATES.		
Alabama	26	
Arizona	5	
Arkansas	9	
California	96	
Colorado	28	
Connecticut	50	
Delaware	8	
District of Columbia	79	
Florida	10	
Georgia	22	
Hawaii	4	
Idaho	4	
Illinois	149	
Indian Territory	3	
Indiana	20	
Iowa	16	
Kansas	11	
Kentucky	32	
Louisiana	24	
Maine	20	
Maryland	40	
Massachusetts	171	
Michigan	46	
Minnesota	43	
Mississippi	11	
Missouri	90	
Montana	7	
Nebraska	9	
Nevada	2	
New Hampshire	8	
New Jersey	82	
New Mexico	5	
New York	874	
North Carolina	5	
Ohio	104	
Oklahoma	4	
Oregon	13	
Pennsylvania	312	
Rhode Island	31	
South Carolina	10	
South Dakota	1	
Tennessee	35	
Texas	31	
Carried forward	2 550	108
Brought forward	2 550	108
Utah	11	
Vermont	6	
Virginia	40	
Washington	24	
West Virginia	20	
Wisconsin	21	
Wyoming	3	2 675

CENTRAL AMERICA.

COSTA RICA	2	
NICARAGUA	2	
PANAMA	1	
SALVADOR	2	7

SOUTH AMERICA.

ARGENTINE REPUBLIC	4	
BRAZIL	1	
CHILI	2	
COLOMBIA	2	
PERU	3	12

WEST INDIA ISLANDS.

CUBA	12	
JAMAICA	1	
PORTO RICO	2	
TRINIDAD	1	16

EUROPE.

AUSTRIA	2	
FRANCE	2	
GERMANY	3	
GREAT BRITAIN	40	
NETHERLANDS	1	
NORWAY	1	
RUSSIA	4	
SPAIN	1	
SWITZERLAND	1	55

AFRICA.

Total in Africa	8	8

ASIA.

CHINA	11	
COREA	1	
INDIA	7	
JAPAN	12	
PHILIPPINE ISLANDS	12	
STRAITS SETTLEMENTS	1	44

AUSTRALASIA.

Total in Australasia	19	19
Address Unknown	10	10

Total Membership, 2 954.

SUBSCRIBERS TO THE BUILDING FUND,

1881 to 1886.

The names of deceased subscribers to this fund, and of those whose address is unknown, have been omitted from this list, and the names of many living subscribers have, with their consent, also been omitted.

Boston Gas Light Company	24 West St., Boston, Mass.
Boyd, Charles R.	Wytheville, Va.
Griswold, Frank L.	Cruz del Eje, Cordoba, Argentine Republic.
Maher & Brayton	Cleveland, Ohio.
Sorzano, Julio F.	33 Broadway, New York City.
Towle, Stevenson	220 Broadway, New York City.

PAST AND PRESENT OFFICERS

AND YEARS IN WHICH THEY HELD OFFICE.

The figures of the year during which office was held are, to save space, printed without those of the century. In some cases they do not show the year in which office was taken; for instance, an officer whose term extended from November, 1873, to November, 1875, appears in this table as having held office during 1874 and 1875, or 74–75.

The names of deceased members are printed in italics.

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Adams, Julius Walker	74–75	68–73	......	......	53, 76
Allen, Horatio	72–73	......	......	......	......
Archbald, James	......	......	......	......	87
Becker, Max Joseph	89	......	......	......	......
Bensel, John Anderson	......	......	......	......	99–01
Benzenberg, George Henry	......	01–02	......	......	95–97
Bogart, John	......	......	78–90	76–77, 91–94	73–75
Boller, Alfred Pancoast	......	......	70–71	......	72
Bontecou, Daniel	......	......	......	......	96–98
Bouscaren, Louis Frederic Gustave	......	03–04	......	......	81
Briggs, Josiah Ackerman	......	......	......	......	01–03
Browne, George Hamilton	......	......	......	......	95–97
Brush, Charles Benjamin	......	92–93	......	......	88–91
Buchholz, Carl Waldemar	......	......	......	......	99–01
Buck, Leffert Lefferts	......	......	......	......	92–94
Buck, Richard Sutton	......	......	......	......	02–04
Burr, William Hubert	......	......	......	......	94–96
Carter, Edward Carlos	......	......	......	......	01–03
Cartwright, Robert	......	99–00	......	......	95–97
Casey, Thomas L.*	......	......	......	......	82
Chanute, Octave	91	80–81	......	......	74–76, 85
Chesbrough, Ellis Sylvester	78	......	......	......	70
Chesbrough, I. C.*	......	......	......	......	55–67
Clark, Jacob Merrill	......	72–73	......	......	70–71
Clarke, Eliot Channing	......	......	......	......	89
Clarke, Thomas Curtis	96	71	......	......	79
Cohen, Mendes	92	90	......	......	88
Collingwood, Francis	......	......	91–94	......	73–76

* Resigned.

NAME.	President.	Vice-President.	Secretary.	Treasurer.	Director.
COOPER, THEODORE	......	......	......	......	84–85
Copeland, Charles W.	......	53–69	......	......	......
CORTHELL, ELMER LAWRENCE	......	89, 93–94	......	......	......
CRAIGHILL, WILLIAM PRICE†	94	......	......	......	92–93
CRAVEN, ALFRED	......	......	......	......	03–04
Craven, Alfred Wingate	70–71	54–67	......	......	53, 68–69, 72–73
CROES, JOHN JAMES ROBERTSON	01	88	......	78–87	77
CROSBY, BENJAMIN LINCOLN	......	......	......	......	97–99
CROWELL, FOSTER	......	......	......	......	93–95
CURTIS, FAYETTE SAMUEL	......	04	......	......	95–97
Curtis, William Giddings	......	......	......	......	90
DAVIS, JOSEPH PHINEAS	......	84	......	......	78, 81–83
DAVISON, GEORGE STEWART	......	......	......	......	03–04
DEYO, SOLOMON LEFEVRE	.....	04	......	......	98–00
Dresser, George Warren	......	......	......	......	82
Eads, James Buchanan	......	82	......	......	......
ELLIS, JOHN WALDO	......	......	......	......	04
Ellis, Theodore Grenville	......	74–77	......	......	79
ELY, THEODORE NEWEL	......	......	......	......	92–93
ENDICOTT, MORDECAI THOMAS	......	......	......	......	01–03
FANNING, JOHN THOMAS	......	......	......	......	93–95
Fink, Albert	80	78–79	......	......	......
FITZGERALD, DESMOND	99	95–96	......	......	92–94
Flad, Henry	86	83	......	......	......
FORD, JAMES K.*	......	......	......	......	68–69
FORNEY, MATTHIAS N.*	......	......	......	......	77
FORSYTH, ROBERT	......	......	......	......	87
Francis, James Bicheno	81	70, 79–80	......	......	......
FRAZIER, JAMES LEWIS	......	......	......	......	02–04
FREEMAN, JOHN RIPLEY	......	02–03	......	......	96–98
Fteley, Alphonse	98	89–91	......	......	88
Fuertes, Estevan Antonio	......	......	......	......	92
Gardiner, Edward	......	53	54	54	......
Gillmore, Quincy Adams	......	......	......	......	76
GORSUCH, ROBERT B.*	......	......	53	53	......
Gottlieb, Abraham	......	......	......	......	92–93
GOWEN, CHARLES SEWALL	......	......	......	......	04
Graff, Frederic	85	......	......	......	84
GRAY, SAMUEL MERRILL	......	92	......	......	......
GREEN, BERNARD RICHARDSON	......	......	......	......	94–96
Greene, George Sears	76–77	......	......	......	68–69, 71, 73, 75, 77–79
GREENE, GEORGE SEARS, JR.	......	85	......	88–90	82–84, 86

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* Resigned.

† Elected President during his term of office as Director.

PAST AND PRESENT OFFICERS

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Gzowski, Sir Casimir Stanislaus	......	......	......	......	94
Haines, Henry Stevens	......	01–02	......	......	97–99
Hamilton, William Gaston	......	......	......	......	83, 87
Harrod, Benjamin Morgan	97	95–96	......	......	92–94
Hering, Rudolph	......	00–01	......	......	91, 97–99
Hermany, Charles	04	91	......	......	80
Herschel, Clemens	......	......	......	......	91
Hill, Albert Banks	......	......	......	......	92
Holley, Alexander Lyman	......	77	......	......	76
Hunt, Charles Warren	......	......	95–04	......	......
Hutton, William Rich	......	96–97	......	......	84–86
Jackson, William	......	......	......	......	02–03
Johnson, Lorenzo Medici	......	......	......	......	97–99
Johnson, Thomas H.	......	......	......	......	00–02
Just, George Alexander	......	......	......	......	96–98
Katté, Walter	......	......	......	......	85, 89
Keefer, Thomas Coltrin	88	86–87	......	......	82
Kennedy, John	......	......	......	......	98–00
Kennedy, William Harlin†	......	......	......	......	02–03
Kirkwood, James Pugh‡	68	......	......	......	53–67
Knap, Joseph Moss	......	......	......	00–04	94–96
Kuichling, Emil	......	......	......	......	01–03
Landreth, Olin Henry	......	......	......	......	93–95
Laurie, James	53–67	......	......	......	......
Leverich, Gabriel	......	......	72–77	......	......
Lewis, Eugene Castner	......	......	......	......	03–04
Lewis, Nelson Peter	......	......	......	......	04
Ludlow, William	......	......	......	......	90
McAlpine, William Jarvis‡	68–69	......	......	......	54–67, 70
Macdonald, Charles	......	93–94	......	......	71, 74–75
McDonald, Hunter	......	......	......	......	03–04
MacLeod, John	......	92	......	......	......
McMath, Robert Emmet	......	......	......	......	89
McNulty, George Washington	......	......	......	......	92–93
McVean, John Jay	......	......	......	......	98–00
Manley, Henry	......	......	......	......	98–00
Martin, Charles Cyril	......	94–95	......	......	......
Marx, Charles David	......	......	......	......	04
Mead, Elwood	......	......	......	......	03–04
Mendell, George Henry	......	97–98	......	......	......
Merrill, William Emery	......	......	......	......	83
Metcalf, William	93	......	......	......	83–84
Meyer, Thomas C.§	......	......	69	......	......

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† Elected Director Dec. 3d, 1901, to fill the vacancy caused by the death of George A. Quinlan.

‡ Mr. Kirkwood resigned the Presidency August 5th, 1868, and Mr. McAlpine was elected for the unexpired term.

§ November 3d, 1869, to January 5th, 1870.

NAME.	President.	Vice-President.	Secretary.	Treasurer.	Director.
MODJESKI, RALPH	......	......	......	......	04
MOORE, ROBERT	02	88, 99–00	......	......	92–93
MORDECAI, AUGUSTUS	......	......	......	......	95–97
Morell, W. H.	......	......	......	......	53
Morison, George Shattuck	95	......	......	......	......
MORRIS, HENRY GURNEY	......	......	......	......	86
Morse, James Otis	......	......	55–69	55–75	54–67, 77
Morse, Henry Grant	......	......	......	......	97–99
MYERS, CHARLES HAYWARD	......	......	......	......	92
MYERS, EDMUND TROWBRIDGE DANA	......	......	......	......	92
NICHOLS, OTHNIEL FOSTER	......	......	......	......	92–93
NOBLE, ALFRED†	03	00–01	......	......	95
NORTH, EDWARD P.	......	98–99	......	......	91
O'ROURKE, JOHN FRANCIS	......	......	......	......	00–02
OSBORN, FRANK CHITTENDEN	......	......	......	......	01–03
OSGOOD, JOSEPH OTIS	......	......	......	......	03–04
OWEN, JAMES	......	......	......	......	97–99
PAINE, CHARLES	83	......	......	......	......
Paine, William H.	......	82–84	......	......	77–81
PARSONS, WILLIAM BARCLAY	......	......	......	......	96–98
PEGRAM, GEORGE HERNDON	......	......	......	......	02–04
PETERSON, PETER ALEXANDER	......	96–97	......	......	92–93
Pope, Willard Smith	......	......	......	......	93–95
Pratt, J. W.	......	......	......	......	54
Prosser, Thomas	......	......	......	......	70
PROUT, HENRY GOSLEE	......	......	......	......	93–95
Quinlan, George Austin	......	......	......	......	00–01
RAMSEY, JOSEPH, JR.	......	......	......	......	00–02
READ, ROBERT LELAND	......	......	......	......	92–93
RICHARDSON, HENRY BROWN	......	......	......	......	00–02
RICKETTS, PALMER CHAMBERLAINE	......	......	......	......	99–01
Roberts, William Milnor	79	74–76, 78	......	......	77
ROWLAND, THOMAS FITCH	......	86–87	......	......	71–73
SCHNEIDER, CHARLES CONRAD	......	02–03	......	......	87, 98–00
SCHUYLER, JAMES DIX	......	03–04	......	......	92, 99–01
SEAMAN, HENRY BOWMAN	......	......	......	......	00–02
SEE, HORACE*	......	......	......	......	96–98
Shinn, William Powell	90	......	......	......	89
Sidell, W. H.	......	......	......	......	53
Smith, Charles Shaler	......	......	......	......	78
Smith, Charles Vandervoort	......	......	......	......	78–81

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* Resigned.

† Elected Director Nov. 5th, 1895, to fill the vacancy caused by the death of Willard S. Pope.

PAST AND PRESENT OFFICERS

Name.	President.	Vice-President.	Secretary.	Treasurer.	Director.
Smith, T. Guilford	......	......	......	......	94–96
Sooysmith, Charles	......	......	......	......	95–97
Stanton, Robert Brewster	......	......	......	......	94–96
Stearns, Frederic Pike	......	98–99	......	......	93–95
Strobel, Charles Louis‡	......	......	......	......	86, 94
Swain, George Fillmore	......	......	......	......	01–03
Symons, Thomas William	......	......	......	......	96–98
Talcott, William Hubbard	......	......	......	......	54–68
Thomson, John	......	......	......	95–99	92–94
Towle, Stevenson	......	......	......	......	87–88
Turner, Edmund Kimball	......	......	......	......	99–01
Van Buren, Robert	......	......	......	......	90
Van Hoesen, Edmund French	......	......	......	......	02–04
Van Horne, John Garret	......	......	......	......	92
Van Winkle, Edgar Beach	......	......	......	......	80
Vaughan, Frederic Willis	......	......	......	......	85
Voorhees, Theodore	......	......	......	......	90
Wallace, John Findley	00	97–98	......	......	......
Ward, John Frothingham *	......	......	......	......	68–72
Warren, Gouverneur K. *	......	......	......	......	80
Webster, George Smedley	......	......	......	......	04
Welch, Ashbel †	82	81	......	......	......
Whinery, Samuel	......	92–93	......	......	91, 99–01
Whitcomb, Henry Donald	......	......	......	......	94–96
White, William Howard	......	......	......	......	86
Whitman, Thomas Jefferson	......	85	......	......	......
Whittemore, Don Juan	84	......	......	......	81
Wilgus, William John	......	......	......	......	02–04
Wilson, Joseph Miller	......	94–95	......	......	88
Wisner, George Y.	......	......	......	......	98–00
Wood, De Volson *	......	......	......	......	74
Worthen, William Ezra	87	......	......	......	72

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* Resigned.

† Mr. Welch died September 25th, 1882, during his term of office as President.

‡ Elected Director to fill the vacancy caused by the death of Abraham Gottlieb, Feb. 9th, 1894

DECEASED MEMBERS.

H. M., Honorary Member. M., Member. A. M., Associate Member. F., Fellow.
A., Associate. J., Junior.

Name.	Date of Election.	Date of Death.	Memoirs.*
Abert, John James	H. M. Mar. 2, 1853.	Jan. 27, 1862.	XIX, 88
Abert, Sylvanus Thayer	M. Sept. 21, 1870.	Aug. 11, 1903.	....
Abbott, Job	M. April 1, 1891.	Aug. 18, 1896.	*XXXVI, 538*
Ackenheil, Charles	M. Feb. 2, 1887.	June 20, 1890.	XVII, 137
Adams, Julius Walker	M. Nov. 5, 1852. H. M. Oct. 26, 1888.	Dec. 13, 1899.	....
Ainslie, George	F. May 28, 1872.	Sept. 6, 1878.	XV, 41
Aldrich, James Colwell	M. May 7, 1873.	April 3, 1900.	*XLV, 617*
Allaire, William Miller	J. Mar. 2, 1881.	Dec. 14, 1884.	XIX, 67
Allen, Horatio	M. Dec. 4, 1867. H. M. Mar. 4, 1874.	Dec. 31, 1889.	XVI, 180
Allen, Theodore	M. Nov. 16, 1870.	Sept. 18, 1890.	XVII, 240
Allen, William Albert	M. May 6, 1891.	Mar. 21, 1896.	*XXXVI, 539*
Allis, Edward Phelps	F. Aug. 4, 1883.	April 1, 1889.	XV, 168
Anderson, Adna	M. Sept. 2, 1874.	May 15, 1889.	XV, 166
Ansley, George Doane	M. Sept. 4, 1878.	Sept. 22, 1883.	XV, 109
Arthur, William Young	M. Dec. 4, 1867. F. Sept. 20, 1870.	Feb. 15, 1876.	....
Aspinwall, William Howland	F. July 9, 1870.	Jan. 18, 1875.	*XXXVI, 598*
Atwood, William Henry	M. May 4, 1881.	Sept. 4, 1890.	XVII, 205
Avery, John	M. Dec. 4, 1867.	Jan. 30, 1884.	XI, 117
Bache, Alexander Dallas	H. M. Mar. 2, 1853.	Feb. 17, 1867.	*XXXVI, 522*
Bailey, Thomas Norton	M. Nov. 7, 1883.	April 20, 1886.	XVI, 186
Baker, William Latimer	J. Jan. 6, 1875. M. Nov. 6, 1878.	May 28, 1888.	XV, 111
Bannister, Charles Kimball	M. May 3, 1893.	Jan. 10, 1901.	....
Barbour, William Sullivan	M. April 17, 1872.	Feb. 24, 1889.	XV, 142
Barnard, John Gross	M. Sept. 15, 1869. H. M. April 7, 1873.	May 14, 1882.	XIII, 134
Barnes, David Leonard	M. July 2, 1890.	Dec. 15, 1896.	*XLI, 618*
Barnes, James	M. Mar. 13, 1853.	Feb. 12, 1869.	*XXXVI, 540*
Barriger, John Walker, Jr.	J. May 31, 1898. A. M. April 2, 1902.	Dec. 19, 1902.	....
Bartlett, Winthrop	M. Jan. 2, 1889.	Jan. 16, 1899.	....

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* The italic references in this column are to the volume and page of *Transactions*, in which the Memoirs prepared after January 1st, 1896, were published; the other figures refer to the volume and page of *Proceedings*, where the Memoirs prepared earlier than that date will be found.

Name.	Date of Election.	Date of Death.	Memoirs.*
Batterson, James Goodwin	F. June 7, 1876.	Sept. 18, 1901.	....
Baumann, Edward	A. June 2, 1880.	Jan. 26, 1889.	XV, 114
Bayley, George William Read	M. July 10, 1872.	Dec. 14, 1876.	IV, 58
Beardsley, Frank Chester	M. Nov. 7, 1894.	July 1, 1895.	XXI, 182
Becker, Max Joseph	M. Aug. 7, 1872.	Aug. 23, 1896.	*XXXVII, 555*
Behrens, William Frederic	J. Nov. 6, 1889. A. M. June 7, 1893.	Feb. 6, 1894.	XX, 87
Belknap, Morris Sheppard	M. Aug. 7, 1872.	July 19, 1890.	XVI, 167
Bell, James E.	M. Mar. 5, 1879.	June 9, 1879.	V, 98
Bentley, Henry Adamson	M. Mar. 2, 1881.	May 13, 1889.	....
Benyaurd, William H. H.	M. Nov. 3, 1875.	Feb. 7, 1900.	....
Beresford, Frank	J. Sept. 7, 1887.	Dec. 12, 1887.	*XXXVI, 594*
Bishop, Thomas Sparks	M. Sept. 2, 1885.	Nov. 13, 1898.	*XLI, 621*
Blake, Edward Josiah	M. April 3, 1889.	May 29, 1902.	....
Blickensderfer, Jacob	M. June 1, 1881.	Feb. 26, 1899.	....
Bliss, Henry Isaac	M. Sept. 5, 1883.	July 10, 1896.	*XXXVI, 541*
Blunden, Henry D.	J. Jan. 5, 1876. M. Feb. 4, 1880.	Jan. 7, 1889.	*XXXVI, 542*
Bodfish, Sumner Homer	M. Oct. 2, 1889.	May 17, 1894.	XX, 96
Boeke, August William	M. Sept. 3, 1890.	Oct. 24, 1894.	XX, 204
Bogart, James Peter	J. Jan. 4, 1882. M. July 3, 1895.	Dec. 24, 1903.	....
Bond, Frederick Winn	M. Dec. 7, 1898.	July 12, 1903.	*LI, 452*
Booker, Bernard Frank	J. Oct. 7, 1885. M. June 2, 1891.	July 21, 1894.	XX, 183
Bradbury, Henry Robert	A. July 6, 1881.	July 3, 1901.	....
Bridgford, John	F. Jan. 14, 1871.	Mar. 8, 1898.	....
Briggs, Albert Dwight	F. May 17, 1870.	Feb. 20, 1881.	XV, 132
Briggs, Robert	M. Oct. 19, 1870.	July 24, 1882.	*XXXVI, 542*
Brough, Redmond John	M. Sept. 1, 1880.	July 21, 1883.	XII, 40
Brown, Charles Irwin	M. Jan. 7, 1891.	Mar. 23, 1899.	....
Brown, John Milton	M. April 1, 1874.	June 16, 1874.	I, 170
Bruner, Daniel Pastorius	J. Sept. 6, 1876. M. May 7, 1879.	Aug. 29, 1901.	....
Brush, Charles Benjamin	A. Sept. 6, 1871. M. Sept. 5, 1877.	June 3, 1897.	....
Buckhout, Isaac Craig	M. July 15, 1872.	Sept. 27, 1874.	I, 171
Burden, Henry	H. M. Mar. 2, 1853.	Jan. 19, 1871.	....
Burr, James Dewey	M. April 5, 1876.	May 5, 1886.	XII, 107
Butts, Elijah Polhill	J. Nov. 3, 1886.	Jan. 11, 1892.	XVIII, 129
Camp, Jonathan, Jr.	M. Dec. 31, 1873.	April 16, 1874.	I, 186
Campbell, Allan	M. Feb. 19, 1868. H. M. Mar. 1, 1892.	Mar. 18, 1894.	XX, 179
Campbell, Charles Edward Henry	M. Oct. 3, 1883.	Dec. 6, 1902.	....

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* The italic references in this column are to the volume and page of *Transactions*, in which the Memoirs prepared after January 1st, 1896, were published; the other figures refer to the volume and page of *Proceedings*, where the Memoirs prepared earlier than that date will be found.

Name.	Date of Election.	Date of Death.	Memoirs.*
Card, Joseph P.	A. Sept. 5, 1883.	Oct. 22, 1894.	XXI, 68
Card, William Warren	M. Sept. 5, 1883.	April 4, 1903.	....
Carpenter, Clarence Allan	M. May 2, 1888.	Nov. 9, 1899.	....
Carrel, Frederick Janvrin	M. Mar. 5, 1884.	May 2, 1894.	*XXXVII, 559*
Cartwright, Henry	M. Sept. 6, 1876.	June 30, 1881.	VII, 124
Cary, Edgar Sheldon	M. Nov. 1, 1882.	Jan. 5, 1883.	*XLVI, 555*
Cass, George Washington, Jr.	F. Mar. 30, 1871.	Mar. 21, 1888.	*XXXVI, 599*
Chase, Samuel Stewart	M. Dec. 8, 1868. F. Mar. 12, 1870.	May 29, 1873.	I, 40
Cheney, Nathaniel	F. June 21, 1870.	June 29, 1901.	....
Chesbrough, Ellis Sylvester	M. June 17, 1868.	Aug. 18, 1886.	XV, 160
Cisneros, Francisco Javier	M. May 15, 1872.	July 7, 1898.	*XLI, 622*
Clapp, Lorenzo Russell	M. Feb. 1, 1888.	Aug. 13, 1902.	*XLIX, 341*
Clark, Ira Edgar	J. Feb. 6, 1878.	May 23, 1882.	VIII, 92
Clark, Jacob Merrill	M. Jan. 29, 1868.	Dec. 21, 1894.	XX, 203
Clarke, Henry Wadsworth	M. Mar. 15, 1871.	Feb. 23, 1892.	XVIII, 93
Clarke, Thomas Curtis	M. Mar. 18, 1868. F. May 20, 1872.	June 15, 1901.	*L, 495*
Cleemann, Thomas Mutter	M. Oct. 1, 1879.	Nov. 16, 1893.	XX, 69
Clemens, Ernest Victor	M. Mar. 1, 1893.	Sept. 3, 1893.	XX, 161
Clement, Victor M.	F. Jan. 8, 1890.	April 28, 1903.	....
Cleverdon, Henry Lawrence	A. M. Mar. 1, 1899.	Aug. 27, 1902.	*L, 507*
Cobb, Robert Linah	M. Jan. 2, 1890.	June 2, 1895.	*XXXVI, 545*
Cochran, A. P.	F. June 19, 1872.	April 26, 1886.	.. ..
Colburn, Warren	M. Mar. 18, 1868.	Sept. 15, 1879.	VI, 4
Colburn, Zerah	M. Jan. 5, 1855.	April 26, 1870.	*XXXVI, 546*
Colby, Charles Lewis	F. July 31, 1883.	Feb. 26, 1896.	....
Colman, Isaac D.	M. Feb. 27, 1869.	April 7, 1875.	I, 331
Connor, Addison	M. Jan. 5, 1887.	Jan. 4, 1891.	*XXXVI, 551*
Conro, Albert	F. June 13, 1883.	Jan. 10, 1901.	....
Cooke, Robert Latimer	M. April 17, 1872.	Aug. 11, 1877.	IV, 66
Coppée, Henry St. Leger	M. Oct. 5, 1887.	May 8, 1901.	....
Correa, Edward Arnold	M. Mar. 7, 1900.	June 24, 1900.	*XLV, 621*
Coryell, Martin	M. Dec. 4, 1867.	Nov. 30, 1886.	XV, 133
Courtwright, Milton	F. June 11, 1870.	April 25, 1883.	....
Coxe, Eckley Brinton	M. Feb. 7, 1877.	May 13, 1895.	*XXXVI, 552*
Crabb, Thomas	J. April 4, 1899.	Dec. 21, 1901.	.. ..
Craven, Alfred Wingate	M. Nov. 5, 1852.	Mar. 27, 1879.	VI, 24
Craven, Henry Smith	M. Dec. 3, 1884.	Dec. 7, 1889.	XVI, 217
Cunningham, Paul Davis	A. M. Mar. 1, 1899.	July 13, 1901.	....
Curtis, Wendell Rhodes	J. Mar. 3, 1875. M. June 4, 1884.	Mar. 7, 1893.	XX, 86
Curtis, William Giddings	M. May 3, 1882.	June 15, 1900.	*XLV, 624*
Cushing, Oliver E.	M. July 10, 1872.	Jan. 17, 1890.	XVI, 166
Cushing, Robert Delano	A. M. Sept. 6, 1899.	Aug. 23, 1903.	....

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DECEASED MEMBERS C–E

Name.	Date of Election.	Date of Death.	Memoirs.*
CUSHING, SAMUEL BARRETT	M. Sept. 2, 1869.	July 17, 1873.	I, 43
CUSHING, SAMUEL BARRETT	M. June 1, 1887.	Dec. 2, 1888.	*XLIX, 343*
DAGRON, JAMES GUSTAVUS	M. Oct. 6, 1886.	May 25, 1895.	....
DAVIDSON, MATTHIAS OLIVER	M. April 6, 1853.	Sept. 1, 1872.	XIX, 56
DAVIS, FRANK PAUL	M. Feb. 1, 1888.	May 3, 1900.	....
DAVIS, JOHN WOODBRIDGE	A. June 3, 1885.	Nov. 7, 1902.	*XLIX, 370*
DEARBORN, WILLIAM LEE	M. Jan. 29, 1868.	Mar. 15, 1875.	I, 330
DECOURCY, BOLTON WALLER	M. Nov. 6, 1889.	April 1, 1900.	....
DEFOREST, GEORGE THOMPSON	A. M. Dec. 4, 1895.	July 25, 1901.	....
DEGARAY, FRANCISCO	F. Aug. 31, 1883.	Sept. 2, 1896.	....
DEL MONTE, EMILIO	M. Dec. 4, 1895.	Mar. 20, 1902.	....
DERBISHIRE, JAMES STEWART	M. April 2, 1884.	Jan. 2, 1887.	XIII, 66
DEXTER, GEORGE M.	M. Dec. 3, 1852.	Nov. 26, 1872.	I, 40
DICKINSON, GEORGE CODWISE	M. Feb. 5, 1890.	Jan. 24, 1892.	XVIII, 71
DICKINSON, POMEROY P.	M. Jan. 17, 1872.	Oct. 4, 1895.	*XLIII, 611*
DILLON, SIDNEY	F. Mar. 26, 1870.	June 9, 1892.	*XXXVI, 603*
DIRKS, JUSTUS	H. M. June 2, 1880.	Dec. 26, 1886.	XIII, 45
DIVEN, ALEXANDER SAMUEL	F. June 16, 1870.	June 11, 1896.	*XXXVII, 571*
DOANE, THOMAS	M. June 7, 1882.	Oct. 22, 1897.	*XXXIX, 690*
DORAN, FRANK C.	M. Sept. 5, 1883.	Oct. 15, 1898.	....
DORSEY, EDWARD BATES	M. June 4, 1879.	†	....
DOWNES, STANCLIFF BAZEN	J. April 7, 1886.	April 21, 1895.	XXI, 105
DRESSER, GEORGE WARREN	M. July 5, 1876.	May 27, 1883.	XIX, 110
DUANE, JAMES	M. Mar. 2, 1892.	Jan. 12, 1899.	....
DUANE, JAMES CHATHAM	H. M. Nov. 20, 1886.	Nov. 8, 1897.	*XXXIX, 686*
DU BARRY, JOSEPH NAPOLEON	M. Jan. 6, 1875.	Dec. 17, 1892.	XIX, 108
DUNHAM, CHARLES FREDERICK	M. April 2, 1902.	June 13, 1903.	....
DURANT, THOMAS C.	F. Nov. 18, 1870.	Oct. 5, 1885.	*XXXVI, 602*
EADS, JAMES BUCHANAN	M. Dec. 16, 1868. F. Mar. 30, 1870.	Mar. 8, 1887.	XIII, 46
EATON, HORACE LAFAYETTE	M. Feb. 1, 1893.	Nov. 23, 1895.	*XXXVI, 554*
EAYRS, NORMAN WILDER	M. June 3, 1885.	May 13, 1900.	....
EDGE, GEORGE WASHINGTON	M. Mar. 4, 1874.	Jan. 1, 1880.	VI, 18
ELLIOTT, GEORGE HARFORD	M. April 4, 1883.	Oct. 7, 1886.	XV, 110
ELLIS, NATHANIEL WEBSTER	M. Feb. 2, 1881.	Jan. 16, 1889.	XV, 112
ELLIS, THEODORE GRENVILLE	M. Feb. 17, 1869. F. Nov. 21, 1872.	Jan. 9, 1883.	*XXXVII, 557*
ELLSWORTH, ALFRED BURNHAM	J. May 1, 1889.	Jan. 10, 1893.	XIX, 48
ELY, GEORGE HERVEY	A. May 31, 1892.	Jan. 24, 1894.	....
EMACK, CHARLES S.	M. July 6, 1870.	July 26, 1877.	IV, 65
EMERSON, GEORGE DANA	M. Sept. 18, 1872.	Sept. 26, 1900.	....
EMERY, CHARLES EDWARD	M. May 6, 1874.	June 1, 1898.	*XLII, 558*

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Date of death unknown.

Name.	Date of Election.	Date of Death.	Memoirs.*
Emmet, Thomas Addis	M. Nov. 5, 1852.	Jan. 12, 1880.	VI, 2
Emonts, William Alexis George	J. Sept. 6, 1876.	Nov. 5, 1887.	*XXXVI, 594*
Ensign, Elisha Williams	F. May 18, 1870.	Oct. 1, 1877.	....
Ericsson, John	H. M. Oct. 2, 1879.	Mar. 8, 1889.	....
Evans, Anthony Walton White	M. Dec. 4, 1867. F. Mar. 15, 1870.	Nov. 28, 1886.	XIII, 30
Evans, Louis Provost	M. Sept. 3, 1884.	Aug. 19, 1896.	....
Falconnet, Eugene F.	M. June 3, 1874.	Oct. 14, 1887.	XV, 135
Fargo, William G.	F. May 6, 1870.	Aug. 4, 1881.	....
Farnam, Henry	F. Nov. 14, 1872.	Oct. 4, 1883.	*XXXVI, 605*
Farquhar, Francis Ulric	M. July 10, 1872.	July 3, 1883.	XV, 165
Fava, Francis Renatus, Jr.	M. Nov. 5, 1890.	Mar. 27, 1896.	....
Feind, Anthony Erneste Bernhard	M. Jan. 2, 1890.	Aug. 21, 1894.	XX, 182
Felton, Samuel Morse	F. Mar. 23, 1870.	Jan. 24, 1889.	XIX, 92
Field, Burr Kellogg	M. Oct. 1, 1884.	Jan. 13, 1898.	*XL, 568*
Fink, Albert	M. July 20, 1870. F. Sept. 3, 1872.	April 3, 1897.	*XLI, 626*
Fisher, Charles Henry	M. June 7, 1869.	Jan. 18, 1888.	XIX, 66
Fisher, Clark	M. Oct. 19, 1870.	Dec. 31, 1903.	....
Flad, Henry	M. Feb. 15, 1871.	June 20, 1898.	*XLII, 561*
Flint, Edward Austin	M. May 18, 1870.	Jan. 23, 1886.	XII, 114
Flynn, Benjamin Harrison	J. Oct. 2, 1900.	Mar. 1, 1903.	....
Flynn, Patrick John	M. Feb. 4, 1891.	June 1, 1893.	XX, 68
Fogg, Charles E.	M. Oct. 16, 1872.	April 26, 1891.	XVII, 230
Ford, Arthur Livermore	A. Nov. 6, 1872.	May 30, 1880.	VI, 75
Forshey, Caleb Goldsmith	M. Aug. 7, 1872.	July 25, 1881.	*XXXVII, 560*
Fowler, Charles Edward	M. May 3, 1876.	Jan. 28, 1883.	XV, 164
Francis, James	M. Jan. 4, 1893.	Dec. 1, 1898.	*XLV, 627*
Francis, James Bicheno	M. Nov. 5, 1852. F. May 4, 1870. H. M. April 5, 1892.	Sept. 18, 1892.	XIX, 74
Franklin, William Buel	M. April 1, 1874.	Mar. 8, 1903.	....
Freeman, Ernest Grey	A. M. May 3, 1893. M. Oct. 5, 1898.	Mar. 6, 1900.	....
French, Edmund	M. Nov. 26, 1852.	July 7, 1860.	*XXXVII, 561*
Frost, Benjamin Dix	M. Feb. 21, 1872.	July 19, 1880.	XIII, 139
Fteley, Alphonse	M. Jan. 5, 1876.	June 11, 1903.	....
Fuertes, Estevan Antonio	M. Feb. 17, 1869.	Jan. 16, 1903.	....
Gardiner, Edward	M. Nov. 5, 1852.	†	....
Gardner, Henry A.	M. Dec. 13, 1852.	July 26, 1875.	I, 335
Garfias, Ignacio	M. Oct. 5, 1892.	Jan. 16, 1898.	....
Gelette, William Durfree	M. April 1, 1885.	April 27, 1902.	*L, 500*

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Name.	Date of Election.	Date of Death.	Memoirs.*
Giblin, Arthur Leon	J. Jan. 31, 1893.	July 17, 1894.	XX, 171
Gillespie, Joshua Lathrop	J. Feb. 3, 1875. M. April 2, 1884.	Aug. 22, 1890.	XVI, 224
Gillham, Robert	M. June 2, 1886.	May 19, 1899.	*XLIII, 613*
Gilliss, John Roberts	M. June 2, 1869. F. Mar. 15, 1870.	July 15, 1870.	*XXXVI, 555*
Gillmore, Quincy Adams	M. Dec. 2, 1868.	April 7, 1888.	XX, 60
Gilman, Charles Carroll	F. May 11, 1871.	July 31, 1899.	....
Golay, Philip	M. Sept. 5, 1877.	Oct. 31, 1898.	....
Goodwin, Homer Stanley	M. July 20, 1870.	Oct. 25, 1892.	XIX, 163
Goodwin, John Marston	M. Sept. 4, 1872.	Oct. 21, 1891.	XVII, 267
Gorringe, Henry H.	A. April 6, 1881.	July 6, 1885.	XVI, 215
Gottlieb, Abraham	M. Sept. 4, 1872.	Feb. 9, 1894.	XX, 76
Graff, Frederic	M. May 7, 1873.	Mar. 30, 1890.	XVII, 247
Grant, William Harrison	M. July 2, 1873.	Oct. 12, 1896.	*XXXVI, 557*
Grain, William	M. Sept. 15, 1869.	Jan. 10, 1877.	....
Grassau, H.	M. July 6, 1853.	May 16, 1870.	....
Greene, Benjamin H.	M. May 1, 1878.	Jan. 4, 1890.	XVI, 187
Greene, Charles Ezra	M. Jan. 4, 1882.	Oct. 17, 1903.	....
Greene, Edward Appleton	M. July 4, 1888.	April 19, 1903.	....
Greene, George Sears	M. Nov. 5, 1852. H. M. Oct. 26, 1888.	Jan. 28, 1899.	*XLIX, 335*
Greenwood, William Henry	M. Mar. 3, 1880.	Aug. 29, 1880.	VII, 89
Gridley, Vernon Hill	J. Feb. 4, 1896.	Sept. 17, 1896.	*XXXVI, 595*
Griffen, John	M. April 15, 1868.	Jan. 14, 1884.	XII, 38
Gurnee, Walter S.	F. May 10, 1870.	April 17, 1903.	....
Gzowski, *Sir* Casimir Stanislaus	M. Dec. 2, 1868.	Aug. 24, 1898.	*XLII, 567*
Haddock, Arba Read	A. May 4, 1881.	Feb. 28, 1885.	XIX, 67
Hall, George Thomas	A. Oct. 2, 1872. M. Sept. 2, 1874.	June 2, 1881.	VII, 97
Hamlin, Charles Edward	A. Jan. 2, 1894.	Jan. 20, 1902.	....
Hannaford, Edmund Phillips	M. Sept. 18, 1872.	Aug. 19, 1902.	....
Harbaugh, Springer	F. May 19, 1871.	Dec. 8, 1887.	XV, 46
Hardee, Thomas Sydenham	M. April 4, 1877.	May 20, 1880.	XII, 66
Harding, Horace	M. Nov. 2, 1892.	July 29, 1899.	*XLIII, 618*
Hardy, George Richardson	M. Nov. 7, 1888.	April 2, 1903.	....
Harris, Henrique	M. Dec. 3, 1873.	Oct. 10, 1882.	*XXXVII, 562*
Harris, Robert Lewis	M. May 3, 1876.	Sept. 29, 1896.	....
Harrison, Stephen A.	F. Jan. 30, 1873.	June 6, 1898.	....
Harrod, Thomas	J. Dec. 3, 1891.	Dec. 31, 1896.	....
Hasell, Bentley Douglas	M. July 3, 1878.	May 29, 1900.	....
Haskell, Charles Frederic Beals	M. Oct. 7, 1891.	May 20, 1895.	XXI, 181
Haslett, Sullivan	M. June 4, 1879.	Jan. 4, 1887.	XIII, 127
Hatfield, Robert G.	M. Dec. 4, 1867.	Feb. 15, 1879.	*XXXVI, 558*

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Name.	Date of Election.	Date of Death.	Memoirs.*
Hawkshaw, *Sir* John	H. M. Nov. 3, 1880.	June 2, 1891.	XVII, 250
Hayward, James A.	M. Sept. 5, 1877.	Aug. 13, 1880.	VII, 88
Hegeman, Allen Bogardus	M. Feb. 1, 1888.	Oct. 22, 1892.	XIX, 171
Hildreth, Russell Wadsworth	J. Jan. 4, 1888.	Dec. 23, 1895.	*XXXVI, 596*
Hilgard, Julius Erasmus	M. July 10, 1872.	May 8, 1891.	XVIII, 189
Hillman, Charles La Fletcher	M. July 5, 1876.	June 14, 1902.	*XLIX, 345*
Hislop, John	M. May 1, 1895.	Feb. 22, 1901.	....
Hjortsberg, Maximilian	M. July 10, 1872.	May 16, 1880.	VIII, 118
Hobby, Arthur Stanley	M. June 6, 1894.	May 28, 1902.	*XLIX, 347*
Hoe, Richard March	M. Oct. 1, 1873.	June 8, 1886.	XVI, 170
Holley, Alexander Lyman	M. Oct. 1, 1873.	Jan. 29, 1882.	XVI, 212
Houston, John	M. May 6, 1868.	Aug. 30, 1896.	*XXXIX, 694*
Howe, Milton Grosvenor	M. Oct. 16, 1872.	June 19, 1902.	*XLIX, 349*
Howell, Charles W.	M. Mar. 3, 1875.	April 5, 1882.	VIII, 121
Howell, George Washington	M. May 2, 1888.	Feb. 15, 1901.	*XLIX, 351*
Howland, George, Jr.	F. June 6, 1870.	Feb. 18, 1892.	XX, 154
Humphrey, William Sheldon	A. M. Sept. 2, 1891.	April 18, 1895.	XXI, 98
Humphreys, Andrew Atkinson	H. M. May 7, 1873.	Dec. 27, 1883.	XVI, 218
Hunt, Alfred Ephraim	M. Sept. 1, 1886.	April 26, 1899.	*XLVI, 557*
Hunt, Randell	M. May 2, 1883.	Jan. 24, 1898.	*XLV, 629*
Huntington, Collis Potter	F. Mar. 10, 1877.	Aug. 13, 1900.	....
Hutton, William Rich	M. Jan. 8, 1873.	Dec. 11, 1901.	....
Hyde, William B.	M. July 12, 1877.	June 8, 1882.	XVI, 172
Ives, Edward Bernard	M. April 5, 1893.	Dec. 30, 1903.	....
James, John Collinson	M. Mar. 1, 1876.	Feb. 27, 1883.	XVI, 164
Jennings, Henry Clay	M. April 6, 1887.	Mar. 13, 1894.	XX, 88
Jervis, John Bloomfield	M. Dec. 4, 1867. H. M. Dec. 2, 1868. F. Mar. 19, 1880.	Jan. 12, 1885.	XI, 109
Jewett, William Bradford	J. June 4, 1891.	Nov. 7, 1894.	XX, 202
Johnson, Archibald	M. April 6, 1898.	Oct. 3, 1899.	....
Johnson, Charles Roberts	M. June 3, 1885.	Sept. 11, 1893.	XX, 45
Johnson, John Butler	M. April 7, 1886.	June 23, 1902.	*LI, 454*
Johnson, T. Marr	M. Feb. 26, 1872.	July 31, 1874.	I, 171
Johnston, Andrew Langstaff	M. June 4, 1890.	May 15, 1901.	....
Jones, Benjamin Franklin	F. June 13, 1870.	May 19, 1903.	....
Jordan, Gabriel	M. Sept. 18, 1872.	Nov. 10, 1884.	XVI, 184
Joy, James Frederic	F. Nov. 6, 1872.	Sept. 24, 1896.	*XXXVII, 575*
Judah, Theodore Dehone	M. May 4, 1853.	Nov. 2, 1863.	*XXXVIII, 448*
Keefer, Samuel	M. Jan. 6, 1869.	Jan. 9, 1890.	XVI, 220
Killebrew, Samuel	M. Sept. 2, 1885.	Jan. 9, 1899.	*XLI, 639*

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Name.	Date of Election.	Date of Death.	Memoirs.*
Kingsley, William C.	F. June 6, 1870.	Feb. 21, 1885.	*XXXVI, 612*
Kirkwood, James Pugh	M. Nov. 5, 1852.	April 22, 1877.	IV, 60
Kloman, Andrew	F. Jan. 27, 1875.	Dec. 19, 1880.	VII, 122
Knight, William Baker	J. Jan. 6, 1875. M. Jan. 7, 1880.	Dec. 7, 1890.	XVII, 277
Knowlton, Charles Andrews	M. Oct. 2, 1901.	Mar. 2, 1903.	....
Krupp, Alfred	F. June 14, 1870.	July 14, 1887.	*XXXVI, 609*
Lane, Moses	M. Dec. 4, 1867.	Jan. 25, 1882.	XIX, 58, 101
Lassig, Moritz	M. April 2, 1884.	Jan. 7, 1902.	*XLIX, 353*
Latham, Norman Smith	J. July 3, 1889.	Nov. 10, 1903.	....
Latimer, Charles	M. April 5, 1876.	Mar. 25, 1888.	XV, 137
Latrobe, Charles Hazlehurst	M. Nov. 16, 1870.	Sept. 19, 1902.	....
Laurie, James	M. Nov. 5, 1852.	Mar. 16, 1875.	*XXXVII, 553*
Lawler, John	F. April 28, 1883.	Feb. 23, 1891.	....
Lawson, William Bateman	M. Feb. 1, 1893.	Jan. 27, 1901.	*XLVI, 560*
Lawton, Frederick Beecher	J. Nov. 5, 1891. A. M. Nov. 4, 1896.	Oct. 13, 1897.	....
Leers, Frank Adolph	M. May 4, 1887.	May 19, 1890.	XX, 85
Lesage, Louis	M. Sept. 7, 1881.	Jan. 9, 1889.	XVI, 96
Leutzé, Trevor McClurg	M. Feb. 3, 1897.	Oct. 14, 1901.	....
Lewis, Isaiah William Penn	M. Jan. 5, 1853.	Oct. 18, 1856.	*XXXVIII, 453*
Lewis, James Frederick	A. Feb. 6, 1889.	July 23, 1901.	....
Libby, Edmund Dorman	M. May 6, 1885.	April 24, 1903.	... .
Lincoln, William Shattuck	M. Dec. 5, 1883.	May 16, 1902.	*LI, 457*
Lindenthal, Dominik	A. M. Mar. 4, 1896.	June 7, 1900.	*XLV, 637*
Locke, Augustus Woodbury	M. June 7, 1882.	May 14, 1893.	XIX, 172
Lockwood, John	A. April 5, 1882.	Dec. 9, 1891.	XVIII, 192
Long, Dennis	F. Mar. 28, 1872.	Oct. 8, 1893.	....
Lotz, William Herman	M. Sept. 1, 1875.	Jan. 31, 1894.	XX, 74
Lovecraft, Frederick Aaron	F. Nov. 1, 1892.	Oct. 26, 1893.	....
Lovett, Thomas Davis	M. May 3, 1871.	Dec. 5, 1897.	*XL, 571*
Lowe, Gorham Parsons	M. April 21, 1869.	Jan. 8, 1894.	XX, 72
Lowthorp, Francis C.	M. April 1, 1868. F. Mar. 17, 1870.	June 1, 1890.	XX, 196
Ludlow, William	M. July 5, 1882.	Aug. 30, 1901.	....
Lyon, William M.	F. Mar. 23, 1870.	July 3, 1889.	XVI, 112
Lyte, Francis Asbury	A. M. Oct. 5, 1892.	June 24, 1896	*XXXVIII, 461*
MacLeod, John	M. July 10, 1872.	Jan. 21, 1900.	....
Macy, Arthur	J. July 12, 1877. M. Dec. 2, 1885.	April 14, 1891.	*XXXVII, 562*
McAlpine, Charles LeGrand	M. Dec. 4, 1867.	Jan. 11, 1884.	*XXXVII, 563*
McAlpine, William Jarvis	M. Feb. 3, 1853. H. M. Oct. 26, 1888.	Feb. 16, 1890.	XVIII, 115

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Name.	Date of Election.	Date of Death.	Memoirs.*
McKean, Reginald	A. M. May 2, 1894.	Oct. 15, 1901.	*XLIX, 366*
McNair, Thomas Speer	M. July 2, 1873.	July 25, 1901.	....
Mahan, Dennis Hart	H. M. Mar. 2, 1853.	Sept. 16, 1871.	XIX, 161
Malézieux, Emile	H. M. Nov. 3, 1880.	May 20, 1885.	*XXXVI, 524*
Mann, George Edward	M. Sept. 3, 1884.	Oct. 2, 1897.	....
Marshall, Charles Alfred	M. Oct. 1, 1884.	May 31, 1889.	XVI, 99
Marsland, Edward	M. Feb. 6, 1878.	June 25, 1898.	....
Martin, Charles Cyril	M. July 10, 1872.	July 11, 1903.	....
Martin, Robert Kirkwood	M. June 1, 1892.	Nov. 24, 1893.	XX, 43
Mason, Eddy D.	M. July 19, 1872 F. Dec. 28, 1872.	Dec. 19, 1874.	I, 329
Mendell, George Henry	M. Sept. 6, 1876.	Oct. 19, 1902.	*LI, 459*
Mercur, Frederick	M. July 20, 1870.	Jan. 17, 1888.	XVII, 157
Meriwether, Niles	M. Nov. 1, 1871.	Dec. 28, 1900.	*XLV, 632*
Merrill, William Emery	M. Oct. 6, 1872.	Dec. 14, 1891.	XVIII, 90
Merz, Frederick W.	F. May 28, 1872.	Dec. 8, 1883.	*XXXVI, 615*
Michaelis, Otho Ernest	M. May 6, 1874.	May 1, 1890.	XVII, 132
Michie, William Roberts	J. Feb. 28, 1893. A. M. Oct. 7, 1896.	Feb. 2, 1899.	*XLI, 647*
Miller, Samuel H.	M. Sept. 6, 1882.	Mar. 18, 1891.	XVII, 208
Miller, Silvanus, Jr.	M. Mar. 2, 1887.	Dec. 17, 1897.	*XXXIX, 696*
Mills, James Ellison	M. Feb. 3, 1886.	July 25, 1901.	....
Milne, Peter	A. Jan. 7, 1896.	June 9, 1902.	....
Minturn, Rowland Robinson	M. Nov. 2, 1887.	April 7, 1898.	....
Mitchell, Alexander	F. June 13, 1883.	April 19, 1887.	XIII, 98
Mitchell, Henry	M. Jan. 7, 1880.	Dec. 1, 1902.	....
Moffet, James David	A. M. Nov. 4, 1891. M. Feb. 7, 1894.	Nov. 3, 1899.	....
Monroe, John Albert	M. Sept. 4, 1869.	June 11, 1891.	XIX, 148
Morison, George Shattuck	M. Jan. 6, 1875.	July 1, 1903.	....
Morley, James Henry	M. Oct. 6, 1886.	Sept. 8, 1889.	XVI, 110
Morley, William Raymond	M. Sept. 6, 1882.	Jan. 3, 1883.	IX, 121
Morrell, William H.	M. Nov. 5, 1852.	†	...
Morris, Gouverneur	M. Oct. 3, 1888.	Dec. 30, 1897.	*XXXIX, 698*
Morris, Robert Campbell	M. Jan. 7, 1874.	Nov. 8, 1892.	XVIII, 220
Morris, William W.	M. Jan. 5, 1853.	†	....
Morse, Henry Grant	M. April 7, 1880.	June 2, 1903.	....
Morse, James Otis	M. Feb. 9, 1853.	Mar. 8, 1883.	XIX, 47
Morton, John Henry	M. June 3, 1891.	Feb. 8, 1892.	XVIII, 105
Murdoch, Gilbert	M. Sept. 7, 1881.	May 28, 1894.	XX, 152
Neilson, Robert	M. Feb. 17, 1869.	Oct. 12, 1896.	*XXXVII, 564*
Newell, John	M. Jan. 29, 1868.	Aug. 26, 1894.	XX, 172
Newham, Charles Edward	M. Dec. 7, 1887.	Feb. 1, 1898.	....

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† Date of death unknown.

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Name.	Date of Election.	Date of Death.	Memoirs.*
Newton, Isaac	M. Mar. 3, 1880.	Sept. 25, 1884.	XI, 128
Newton, John	H. M. April 30, 1884.	May 1, 1895.	....
Nichols, Norman James	M. Dec. 5, 1888.	April 8, 1896.	*XXXVI, 559*
Nickerson, Louis H.	M. Sept. 18, 1872.	May 6, 1877.	....
Norman, George H.	M. Feb. 17, 1869. F. Mar. 23, 1870.	Feb. 4, 1900.	....
Norton, Frederick Oakford	F. June 4, 1879.	Sept. 27, 1892.	XVIII, 219
Nourse, Edwin Green	M. Sept. 3, 1884.	Dec. 8, 1897.	*XXXIX, 699*
Noyes, Albert Franklin	M. Dec. 3, 1884.	Oct. 12, 1896.	*XXXVI, 560*
Ogden, William B.	F. Mar. 23, 1870.	Aug. 3, 1877.	IV, 67
Olney, Robert Blum	J. Jan. 3, 1895. A. M. Sept. 5, 1900.	Mar. 4, 1903.	*L, 510*
O'Melveny, John Charles	M. May 4, 1898.	Oct. 3, 1899.	....
O'Sullivan, Thomas S.	M. Jan. 5, 1853.	Nov. 1, 1855.	....
Paddock, Joseph Hill	M. Oct. 5, 1892.	April 4, 1894.	XX, 89
Paine, William H.	M. May 12, 1875.	Dec. 31, 1890.	XVII, 160
Palmer, Cornelius	M. Nov. 2, 1887.	July 31, 1903.	....
Parker, Charles Francis	J. Mar. 5, 1890.	Oct. 10, 1898.	....
Patterson, John Austin	M. May 2, 1900.	May 3, 1903.	....
Pennypacker, Levis Passmore	A. M. April 1, 1891.	Jan. 30, 1901.	*XLVI, 570*
Petry, Alfred	M. Oct. 6, 1886.	May 14, 1901.	....
Philbrick, Edward Southwick	M. May 6, 1874.	Feb. 13, 1889.	*XXXVIII, 454*
Phillips, William	F. Mar. 23, 1870.	April 14, 1874.	I, 169
Phinney, Henry Ward Beecher	M. Jan. 7, 1885.	Nov. 22, 1888.	*XXXVI, 563*
Pike, William Abbot	M. Dec. 3, 1890.	Oct. 13, 1895.	XXI, 212
Platt, Joseph Curtis	M. July 2, 1895.	July 7, 1898.	....
Poe, Orlando M.	M. Jan. 8, 1873.	Oct. 2, 1895.	....
Poinier, P. Porter	J. Mar. 3, 1875.	June 11, 1876.	IV, 74
Pope, Willard Smith	M. Aug. 7, 1872.	Oct. 10, 1895.	*XXXVI, 565*
Porter, Albert Howell	J. July 4, 1888. A. M. July 1, 1891.	Aug. 9, 1899.	....
Post, Andrew Jackson	M. Nov. 1, 1871.	Mar. 12, 1896.	....
Post, James Clarence	M. Feb. 6, 1878.	Jan. 6, 1896.	*XXXVI, 569*
Post, Simeon S.	M. Nov. 5, 1852.	June 29, 1872.	XIX, 49
Potts, Joseph Dilwyn	M. Aug. 5, 1868.	Dec. 3, 1893.	XX, 49
Potts, Richard	M. June 1, 1870.	July 11, 1891.	XVII, 242
Pratt, Thomas Willis	M. Nov. 2, 1853. F. Nov. 4, 1870.	July 17, 1875.	I, 332
Prendergast, Francis Ensor	M. Mar. 7, 1888.	Dec. 7, 1897.	*XXXIX, 701*
Price, Philip M.	M. May 2, 1888.	Oct. 4, 1894.	XX, 200
Prosser, Thomas	M. Dec. 4, 1867.	Sept. 15, 1870.	*XXXVI, 564*
Prosser, Thomas	F. June 1, 1870.	Jan. 6, 1896.	....
Putnam, Joseph W.	A. Mar. 3, 1880.	Mar. 24, 1893.	XX, 87

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Quinlan, George Austin	M. Oct. 4, 1893.	Aug. 29, 1901.	....
Randolph, James Lingan	M. Mar. 1, 1882.	Sept. 17, 1888.	XVIII, 217
Raymond, Thomas Laidlaw	M. Oct. 6, 1897.	Nov. 15, 1901.	*XLIX, 354*
Reece, Benjamin	M. Mar. 2, 1881.	Dec. 17, 1901.	....
Reed, Edward M.	M. July 10, 1872.	Feb. 13, 1892.	XVIII, 94
Reed, Henry Wadsworth	M. Jan. 6, 1886.	Oct. 26, 1900.	....
Reed, Samuel Benedict	M. Oct. 20, 1869.	Dec. 25, 1891.	XVIII, 183
Reed, William Ward	F. Dec. 20, 1872.	Jan. 10, 1904.	....
Reeves, Samuel J.	M. April 5, 1868.	Dec. 15, 1878.	V, 93
Reinholdt, Kenneth Oake Plummer	J. Feb. 6, 1894. A. M. Oct. 7, 1896.	Feb. 6, 1902.	*XLIX, 368*
Reiseger, Marc John	M. Dec. 7, 1898.	May 26, 1900.	*XLV, 634*
Reno, James Hart	M. Nov. 5, 1879.	Aug. 5, 1881.	*XXXVII, 566*
Rhodes, Benjamin	M. April 5, 1882.	Aug. 12, 1894.	XX, 163
Rice, Edward Curtis	M. April 7, 1875.	April 21, 1898.	*XXXIX, 703*
Rich, Watson Wellman	M. Sept. 5, 1883.	Jan. 12, 1903.	*L, 501*
Richards, Joseph Ruggles	A. Feb. 4, 1880.	Sept. 28, 1900.	*XLV, 640*
Rinecker, Francis	M. Aug. 7, 1872.	April 10, 1899.	*XLII, 569*
Rives, Alfred L.	M. Sept. 4, 1872.	Feb. 27, 1903.	....
Roberts, William Milnor	M. Sept. 21, 1870.	July 14, 1881.	*XXXVI, 531*
Robinson, Moncure	H. M. July 6, 1853.	Nov. 10, 1891.	XVIII, 84
Roebling, John Augustus	M. Dec. 2, 1868.	July 22, 1869.	....
Rogers, Albert Brainerd	M. June 6, 1883.	May 4, 1889.	XVI, 98
Rogers, Fairman	M. May 7, 1873.	Aug. 22, 1900.	....
Rogers, John Benjamin	M. Aug. 4, 1873.	April 1, 1874.	I, 168
Rosecrans, William Starke	M. July 5, 1882.	Mar. 11, 1898.	....
Rosenzweig, Alfred	Jun. June 7, 1882. M. Jan. 4, 1893.	Jan. 13, 1904.	....
Rothwell, Richard Pennefather	M. Jan. 29, 1868.	April 17, 1901.	....
Rowe, Robert Delos	M. Jan. 2, 1890.	Mar. 14, 1899.	*XLII, 571*
Rudloff, Henry Frederick	M. Jan. 6, 1886.	June 1, 1895.	*XXXVI, 570*
Rusling, George McCracken	M. Nov. 1, 1882.	Feb. 26, 1901.	....
Russell, Nathaniel Edwards	M. Oct. 3, 1888.	Jan. 14, 1902.	*XLIX, 355*
St. John, Isaac Munroe	M. July 14, 1871.	April 7, 1880.	*XXXVI, 571*
Scherzer, William	M. Sept. 5, 1888.	July 20, 1893.	XX, 58
Schott, Charles Ridgely	M. April 1, 1874.	July 9, 1878.	IV, 128
Schuyler, Howard	M. June 7, 1882.	Dec. 3, 1883.	*XXXVI, 572*
Scott, William Lawrence	F. July 7, 1870.	Sept. 19, 1891.	XVII, 285
Scott, William Ulysses	A. M. Feb. 3, 1897.	Sept. 26, 1898.	*XLII, 572*
Scowden, Theodore Ransom	M. May 7, 1873.	Dec. 31, 1881.	....
Seely, Thomas Jennings	M. Feb. 1, 1882.	Oct. 2, 1883.	*XXXVI, 574*
Seitzinger, William White	J. Oct. 2, 1889.	Sept. 21, 1900.	....
Seymour, Mark Tucker	F. July 21, 1870.	May 30, 1885.	*XXXVII, 578*

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Shaler, Ira Alexander	J. July 4, 1888. M. June 5, 1895.	June 29, 1902.	*XLIX, 357*
Shanks, Thomas Pearman	M. May 2, 1888.	Jan. 7, 1904.	....
Sheldon, Simeon	M. Feb. 5, 1873.	Mar. 4, 1883.	....
Shinn, William Powell	M. Sept. 15, 1869.	May 5, 1892.	XVIII, 123
Shreve, Samuel Henry	M. May 19, 1869.	Nov. 27, 1884.	*XXXVI, 576*
Sicard, Mirtiliano	M. Jan. 4, 1882.	Mar. 17, 1896.	*XL, 577*
Sickels, Frederick Ellsworth	M. Jan. 7, 1891.	Mar. 9, 1895.	*XXXVI, 577*
Sickels, Theophilus E.	M. Feb. 21, 1872.	Feb. 4, 1885.	XI, 130
Sidell, William H.	M. Dec. 1, 1852.	July 1, 1873.	I, 41
Sites, Wilmon W. C.	M. Nov. 6, 1878.	Oct. 1, 1885.	*XXXVI, 582*
Sloan, Robert Imlay	M. Oct. 1, 1884.	May 3, 1901.	*XLVI, 562*
Smedley, Samuel Lightfoot	M. Sept. 2, 1874.	July 21, 1894.	XXI, 88
Smith, Benjamin Burgh	M. Nov. 7, 1888.	Feb. 7, 1904.	....
Smith, Charles Augustus	M. April 7, 1880.	Feb. 2, 1884.	XI, 122
Smith, Charles C.	M. July 10, 1872.	April 17, 1889.	XV, 142
Smith, Charles Shaler	M. Mar. 5, 1873.	Dec. 19, 1886.	XIII, 105
Smith, Charles Vandervoort	M. July 5, 1876.	June 30, 1884.	XI, 126
Smith, David Lowber	M. May 4, 1887.	Oct. 10, 1893.	XX, 57
Smith, Frederick Henry	M. Feb. 21, 1872.	Dec. 24, 1898.	*XLI, 643*
Smith, Hamilton	M. Feb. 5, 1879.	July 4, 1900.	*XLVI, 564*
Smith, Isaac Williams	M. Oct. 1, 1873.	Jan. 1, 1897.	*XXXVIII, 456*
Smith, Lucius A.	M. May 7, 1873.	Jan. 5, 1894.	XX, 48
Sosa, Pedro José	M. Dec. 3, 1884.	July 4, 1898.	....
Spalding, Ira	M. Aug. 2, 1870.	Oct. 2, 1875.	I, 338
Spielmann, Arthur	A. Mar. 5, 1873. M. Sept. 5, 1877.	Nov. 29, 1883.	X, 115
Spörck, Karl	M. Mar. 2, 1898.	June 23, 1899.	....
Stahlberg, Albert Jacob	J. Mar. 4, 1874.	Aug. 19, 1887.	*XXXVI, 597*
Stanwood, James Hugh	A. M. Oct. 3, 1894.	May 24, 1896.	*XXXVI, 590*
Starling, William	M. Sept. 7, 1887.	Dec. 11, 1900.	*XLVI, 566*
Steward, Herbert	A. Feb. 6, 1894.	Mar. 4, 1899.	....
Stewart, David A.	F. Nov. 7, 1872.	Dec. 14, 1888.	XIX, 160
Stixrud, Martinius	M. April 3, 1889.	Dec. 28, 1901.	*LI, 463*
Stone, Waterman	A. Dec. 1, 1886.	Mar. 30, 1896.	*XLI, 649*
Stratton, Franklin Asa	M. May 3, 1876.	July 17, 1879.	V, 96
Striedinger, Julius Hermann	M. Feb. 2, 1876.	Sept. 28, 1894.	XX, 198
Swan, Charles Herbert	M. Mar. 16, 1870.	April 17, 1899.	*XLVI, 568*
Sweet, Elnathan	M. Nov. 6, 1878.	Jan. 27, 1903.	....
Swift, McRee	M. Nov. 6, 1852. F. Mar. 9, 1870.	April 5, 1896.	*XXXVI, 616*
Taintor, William Noyes	J. Sept. 3, 1895.	April 8, 1898.	*XXXIX, 704*
Talcott, Cook	M. April 15, 1868.	Jan. 12, 1893.	XIX, 99
Talcott, William Hubbard	M. Feb. 2, 1853.	Dec. 8, 1868.	XIX, 97

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Tallon, John Joseph	J. Sept. 3, 1890.	May † 1896.	....
Tasker, Charles A.	J. Nov. 4, 1874.	Oct. 4, 1879.	VII, 91
Tasker, Stephen Paschall Morris	F. Sept. 20, 1872.	Mar. 19, 1900.	*XLVI, 572*
Tasker, Thomas T., Jr.	F. Jan. 7, 1873.	Aug. 19, 1877.	....
Taylor, Selwyn Mellon	M. Oct. 7, 1903.	Jan. 25, 1904.	....
Taylor, William Johnston	F. May 10, 1870.	Feb. 17, 1903.	....
Temple, John Frederic	J. Feb. 5, 1890. A. M. Oct. 4, 1893.	July 21, 1895.	XXI, 183
Temple, Robert Henry	M. May 6, 1885.	Dec. 23, 1901.	....
Thaw, William	F. Aug. 30, 1871.	Aug. 17, 1889.	XVI, 100
Thayer, William Watmough	A. M. Dec. 2, 1891.	Mar. 14, 1893.	XIX, 94
Thomas, Arthur Towne	M. June 6, 1894.	Oct. 10, 1900.	*XLIX, 360*
Thomas, Joseph Russell	M. Oct. 5, 1881.	Nov. 28, 1896.	*XXXVII, 566*
Thompson, John Chambers	M. May 18, 1870.	Jan. 17, 1880.	*XXXVI, 584*
Thompson, William George McNeill	M. July 2, 1879.	May 12, 1903.	....
Thorndike, John Larkin	M. May 7, 1873.	Oct. 12, 1901.	....
Thurston, Robert Henry	M. Dec. 6, 1871.	Oct. 25, 1903.	....
Tidd, Marshall Martain	M. Oct. 2, 1878.	Aug. 20, 1895.	*XXXVII, 568*
Totten, Joseph Gilbert	H. M. Mar. 2, 1853.	April 22, 1864.	*XXXVI, 525*
Toucey, John Montgomery	F. May 17, 1870.	Sept. 29, 1898.	*XLV, 644*
Tower, Ashley Bemis	M. Oct. 3, 1894.	July 8, 1901.	*XLIX, 361*
Tracy, Edward Huntington	M. June 13, 1868.	Aug. 28, 1875.	I, 337
Tracy, John F.	F. Jan. 20, 1873.	Feb. 13, 1878.	IV, 71
Trafton, Gilman	M. Jan. 4, 1871.	May 25, 1887.	XV, 42
Truesdell, Charles	M. Sept. 15, 1869.	April 23, 1894.	*XXXVI, 585*
Tyson, Henry	M. July 10, 1872.	Sept. 1, 1877.	IV, 110
Vanderpool, Eugene	M. Sept. 2, 1874.	July 12, 1903.	....
Van Slooten, William	M. Nov. 3, 1897.	Dec. 14, 1901.	....
Vaughan, Frederic Willis	M. Feb. 17, 1869.	Oct. 19, 1887.	XV, 44
Veazie, Joseph	M. May 3, 1876.	Mar. 2, 1897.	....
Vinton, Francis Laurens	M. Aug. 5, 1868.	Oct. 6, 1879.	VIII, 91
Waite, Christopher Champlin	M. Mar. 3, 1880.	Feb. 21, 1896.	*XLIX, 363*
Walker, William Williams	M. Oct. 6, 1880.	Sept. 23, 1893.	XIX, 174
Walling, Henry Francis	M. May 6, 1868.	April 8, 1888.	XV, 140
Walton, Louis Roberts	M. April 1, 1885.	Nov. 9, 1885.	*XXXVI, 586*
Ward, Lebbeus Baldwin	M. Mar. 16, 1870.	July 2, 1901.	....
Wardlaw, James Robert	M. Mar. 3, 1886.	Dec. 27, 1891.	XVIII, 96
Ware, Reuel Willard	M. April 1, 1874.	Sept. 10, 1903.	....
Watkins, John Elfreth	A. Jan. 2. 1889.	Aug. 11, 1903.	... ...
Way, Robert Attwell	M. June 7, 1893.	April † 1901.	....
Weber, Christian Philipp Max Maria, Baron von	H. M. June 2, 1880.	April 18, 1881.	VIII, 89

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† Precise date of death unknown.

DECEASED MEMBERS W–Y

Name.	Date of Election.	Date of Death.	Memoirs.*
Weir, Frederic Candee	M. Aug. 7, 1872.	Mar. 1, 1899.	....
Welch, Ashbel	M. Aug. 7, 1872.	Sept. 25, 1882.	IX, 137
Weld, Frederick Floyd	M. Sept. 3, 1884.	June 28, 1890.	XVII, 203
Wellington, Arthur Mellen	M. May 4, 1881.	May 16, 1895.	XXI, 199
Wellman, David Willard	M. Oct. 5, 1870.	Aug. 18, 1898.	....
Wells, Daniel L.	F. June 13, 1883.	Nov. 24, 1884.	XI, 132
Wheaton, Edward	A. Feb. 4, 1880.	Mar. 6, 1889.	....
Wheeler, Orlando Belina	M. Nov. 2, 1887.	June 3, 1896.	*XXXVI, 587*
Whipple, Squire	H. M. May 6, 1868.	Mar. 15, 1888.	*XXXVI, 527*
White, William Howard	M. Mar. 5, 1873.	Dec. 11, 1895.	*XLV, 635*
Whitelaw, John	M. Feb. 5, 1873.	June 16, 1892.	XVIII, 191
Whitford, Oscar F.	M. Dec. 6, 1871.	May 21, 1902.	*XLIX, 364*
Whitman, Thomas Jefferson	M. Jan. 29, 1868.	Nov. 25, 1890.	XVIII, 103
Whitney, Nelson Oliver	M. Mar. 1, 1893.	Mar. 18, 1901.	....
Whitton, Andrew Dempster	M. May 6, 1891.	Feb. 23, 1892.	XX, 85
Wightman, Henry Morse	M. April 2, 1873.	April 3, 1885.	XII, 124
Wightman, Willard Humphrey	M. Sept. 5, 1888.	Oct. 29, 1889.	XVI, 218
Williams, Edward Higginson	M. Sept. 5, 1883.	Dec. 21, 1899.	....
Williams, Norman A.	M. Feb. 17, 1869.	Oct. 12, 1879.	VIII, 92
Williams, William	F. June 16, 1870.	Sept. 10, 1876.	....
Williamson, William Garnett	M. April 4, 1883.	Aug. 2, 1898.	*XLI, 645*
Wilson, Arthur Owen	M. Mar. 7, 1888.	Dec. 20, 1891.	XVIII, 131
Wilson, John Allston	M. June 7, 1876.	Jan. 19, 1896.	*XXXVI. 588*
Wilson, Joseph Miller	M. April 2, 1873.	Nov. 24, 1902.	*L. 504*
Wilson, William Hasell	H. M. Aug. 2, 1892.	Aug. 17, 1902.	....
Wilson, William Willard	M. Jan. 5, 1870.	Feb. 7, 1887.	XIII, 40
Wood, Arthur Hastings	J. Mar. 31, 1891.	April 2, 1892.	XVIII, 106
Wood, Charles	A. M. July 4, 1894.	Nov. 28, 1895.	*XXXVI, 591*
Worthen, William Ezra	M. Dec. 4, 1867. H. M. April 4, 1893.	April 2, 1897.	*XL, 565*
Worthington, Henry R.	M. Jan. 5, 1876.	Dec. 17, 1880.	....
Wright, George Francis	M. Jan. 4, 1888.	Aug. 20, 1892.	XVIII, 206
Wright, Horatio Gouverneur	H. M. Mar. 3, 1890.	July 2, 1899.	*XLVI, 551*
Wright, Joshua Butler	F. May 24, 1870.	Oct. 31, 1877.	....
Wright, William Wierman	M. Mar. 3, 1875.	Mar. 9, 1882.	VIII, 119
Würtele, Arthur Sheppard Campbell	M. Mar. 5, 1873.	Mar. 20, 1899.	....
Yeatman, Henry Clay	J. May 7, 1890.	Dec. 20, 1896.	*XL, 579*
Yorke, Edward	M. Nov. 1, 1882.	May 28, 1884.	XI, 124
Young, Herbert Andrew	J. May 7, 1884.	Dec. 8, 1894.	XXI, 69
Young, William Clark	H. M. Mar. 1, 1892.	Dec. 22, 1893.	XIX, 192

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